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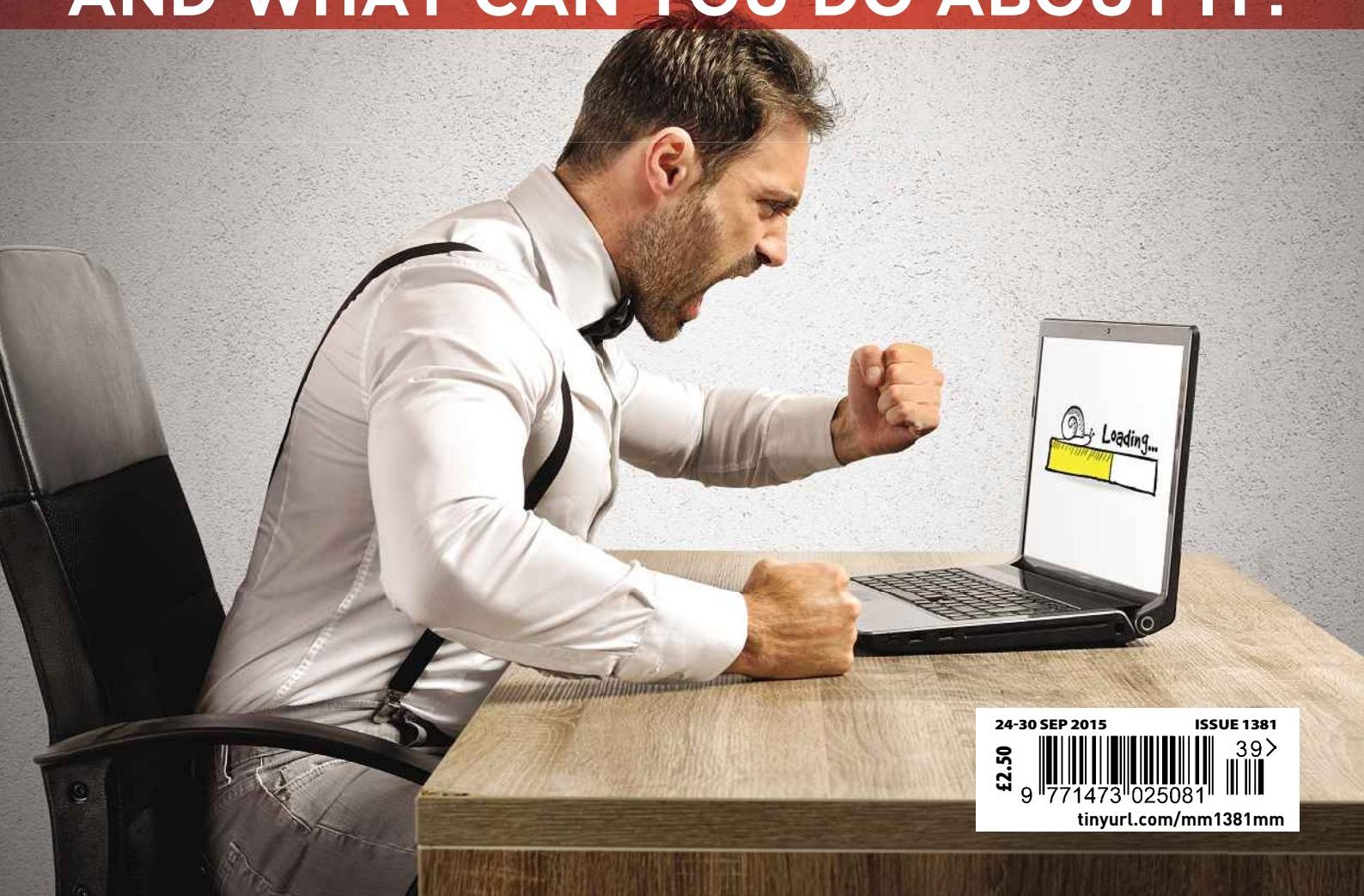
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08 PC Slowdown

If your computer is running more slowly than it should be, then it's possible you're dealing with a resource hog – an item of software that's eating up RAM or demanding constant attention from your processor. How, though, do you identify such a program and, more importantly, how do you fix it? David Crookes provides some answers

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As well as improvements in AI, we're also seeing robots that do things like run and jump. These things combined make for a truly fascinating time to live in, and we've been looking at the latest robotics projects to hit headlines and consider what they might mean for the future

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The mouse is undoubtedly one of the most effective control systems ever invented. Even when a touchscreen is available, the mouse is still often preferable. When it comes to drawing, though, neither of these things comes close to an actual pen. That's why graphics tablets, with their pen-like controls, are so useful. So, to help you choose one, we've been testing six of them this week



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56 The Best Indie Games This Year

It's all well and good buying the latest big budget shooters or football games, but the indie sector also has plenty to offer. In fact, some of the most original and entertaining ideas have come from small developers. That's why we're taking our hats off to the indie scene this week by looking at some of the best games to come out in 2015

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They say you learn something new every day. We're not so sure about that, but with mobile apps, you can certainly have a good crack at making it true. There are tons of apps that help you learn something new or improve your existing skills, and Roland Waddilove has been picking out some of his favourites for us

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Which Programs Are Slowing Down Your Computer?



David Crookes looks at how you can identify system resource hogs and what can you do about them

Is your gaming system struggling to run as well as you want it to? Is it faltering on the latest games and generally failing to capture the magic it had when you first built it? Well, you're not alone. When you first start to use your computer or device, everything can feel shiny, new and fast; that wonderful feeling seldom lasts too long, though. The fact is that, the more you use

Windows, Android, iOS and other operating systems, the greater the risk of tying up valuable system resources. This usually leads to slowdown, poor performance and frustration. The situation isn't helped by the assortment of junkware often installed on your machine by manufacturers, which you most likely have been stuck with from the moment you made your purchase.

Junk has long been a problem for computer users no matter when it is added. When you install software, browse the web or download files, your computer becomes burdened by various system resource hogs competing for attention. Before long, your internet cache becomes full, temporary internet files create clutter, loads of apps begin running at start-up and updates start to introduce inefficiencies by taking up more space and requiring ever more system resources.

Yet that's just the tip of the iceberg. Even when you aren't using a program, it is likely to be running in the background, eating away at the computer's memory and CPU, and impacting on the performance of the apps that you want to use. At its worst, it will contain viruses that start to infiltrate your machine and cause it to become unstable and potentially

Can I Remove Windows Services?

The short answer? Of course. There is a handy list at 7tutorials.com that shows you what you can disable without destroying the way you use your computer. They include Fax, the Print Spooler, Secondary logon, the Tablet PC Input Service in Windows 7 or the Touch Keyboard and Handwriting Panel Service in Windows 8 (assuming you don't have a Tablet PC), Offline Files, Bluetooth Support Service and Routing and Remote Access Service. There are many more – among them Windows Defender and Windows Firewall if you have alternatives – but be sure to read up on the reasonings by going to tinyurl.com/bmrfp2p.



unsafe. For most of the time, this activity will be taking place without you even knowing and yet it is these processes that you will want to stop.

In order for a program to cause a computer to become slower, it must be running in some way. It therefore goes that a program sitting dormant on a machine won't cause any problems. What this means is that, if you have just a handful of programs running and your computer becomes slow, more often than not, you can pinpoint the cause to certain apps. Which ones will depend very much on how you use your machine, though, because different people have different experiences. There are some usual suspects, however.

Some free pieces of software are definite red flags, particularly apps that 'trick' their way into being installed. You may have experienced this when you downloaded – say – a torrent program, and found a toolbar has also been installed in your browser without you knowing. By sneakily hiding the agreement for the secondary installation within the install wizard of the primary app, resource-hungry apps can often find their way on to a computer. Free games and toolbars can be big problems in this respect, but they are only part of the problem: something as simple as a shortcut on your desktop can be an issue since the computer will check to see they are linking to a valid path.

So how do you identify system resource hogs and what can you do about them?

Identify System Hogs

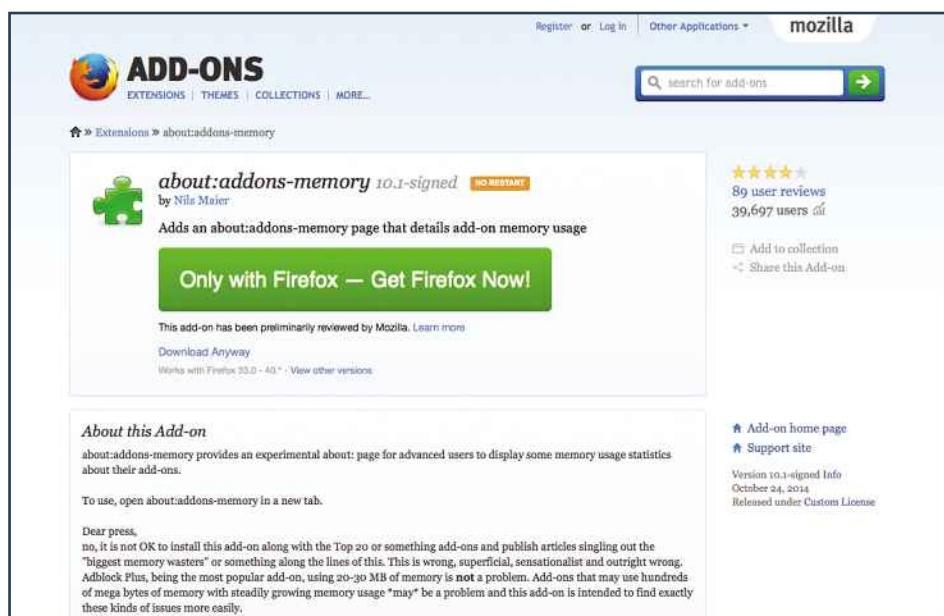
There are many utilities available that allow you to unearth the problematic apps lurking on your system. Best of all, they also allow you to tackle the issue there and then, with the result – hopefully – being a much faster machine. Before we even get on to these utilities, though, let's take a look at the most basic of admin tasks: a good old-fashioned clear out.

We're fairly positive there will be lots of programs on your computer, smartphone or tablet that you just do not want any more. Some of these may even be running background processes right now, sucking up resources. A solid purge of any unwanted program may help to ease the burden on your system, then.

Prior to Windows 10, you did this by going to the Control Panel, clicking Programs and then Programs and Features. By highlighting the program you wished you remove and clicking Uninstall, you could free up space on your hard disk and put a stop to any unwanted background



▲ Cloud-based services such as Dropbox prefer to open on a system startup



▲ The addons-memory extension for Firefox will help to pinpoint rogue browser add-ons

66 Many manufacturers preinstall programs that autostart on your machine 99

running. In Windows 10, this method still works but you can also go to the Start menu, find the program you wish to remove, right-click and select Uninstall. When an uninstall wizard appears, simply follow it through.

The best way, though, is to use the Settings app (Start > Settings > System > Apps & features). The beauty of this method is that you get to see just how much space your various programs are taking up in order of size (so if you're looking to free up some space this is the

best place to look). Find the app that you don't need, right-click and Uninstall. The app and all of its data should be removed, although you may find that a dedicated third-party uninstaller is better.

One of the best is Revo Uninstaller, a fast and easy to use program that allows you to force an uninstall should you need to. It scans for leftover files and monitors system changes when you install apps so that you can assess the program's potential for slowing down your machine. It's by no means the only program of its type:



GeekUninstaller is another useful package that, again, picks up the leftovers from an standard uninstall and ensures they don't have the opportunity to hog any resources. We'd add that you should also consider The PC Decrapifier (www.pcdecrapifier.com/download) which is free for personal use and is great for using on new PCs in order to remove all of the rubbish that gets pre-installed.

Disable Startup Apps

Once you have removed the obvious unwanted programs from your system, the next step should be to remove any apps that you don't want sparking into life when you boot up your computer. Not only can these slow down the time it takes to get going with your machine, they also run processes that you may not need at that time. It's fair to say that many autostart programs are unnecessary and can be stopped without hampering your overall computer experience. A good rule is to only allow an autostarting program if you always want it to boot up quickly whenever you use your machine.

One of the bones of contention when buying a PC is that many manufacturers will preinstall programs that autostart on your machine. You can, however, disable the ones you don't want to activate (and also toggle the rest on and off) by going to the Task Manager in Windows 10 (just right-click on an empty area on the Taskbar and select the application or press Control + Shift + Escape), as part of that there is a Startup tab that shows you all of the programs that begin when you boot your machine, and by right-clicking on any of these programs, you can select Disable. You can also look at the column called Startup Impact. This will show you how much of a burden a program is proving to be on the startup time.

In general, you don't actually need to have any apps automatically starting when you fire up your machine, and it's always best to only activate programs as and when you need them. Instant message and VoIP services such as Skype are handy to have on as default only if you use them often and need to be contactable otherwise you can do without them hogging resources will they test for incoming attempts to connect and advertising your availability.

Cloud services, ranging from OneDrive to Google Drive through to iCloud and Dropbox, also seek to be automatically launched on start-up so they can check for various file updates. Other programs will

Take Precautions

Three things you should do right now:

• Stop Downloading Rubbish

Okay, hold one hand in the air and repeat: "I will not download any more trashy programs". With so many apps around for free, it's always tempting to just give a program a try rather reading up about its suitability beforehand, but it can be hiding to nothing. Not only can some programs trick you into downloading other apps during the installation process, they can also be hard to remove and even contain viruses. By thinking about each program you download before you click the big shiny button, you can protect yourself from unnecessary resource-zapping apps.

• Cut Down On Active Programs

How many programs do you have open at once? Do you open tab after tab in your browser, fire up a word processor, have a game running in the background, keep Skype open and ensure a calendar is to hand just in case? That's something we at *Micro Mart* Towers would never do, oh no (hangs head in shame); by closing apps you don't need at that time, and by removing programs from the Startup queue, you will allow the applications that you do want to use the processing space to breathe, ensuring everything runs that bit faster than before.

• Use Programs Wisely

The main piece shows you just why slapping one add-on after another to a browser can grind things to a halt but it's the same with many other programs. If you have too many emails in your mail client or if you keep iTunes' Smart Playlists going (thereby allowing iTunes to keep analysing your library), then the overall performance of the computer will suffer. You should also keep an eye out for updates but maybe not have them automatically download (if you do, have them download at night). Updates can bring efficiencies to apps but they can also make them more bloated.

66 Some programs run in the background and eat away at the memory and CPU 99

want to check for enhancements that can be downloaded in the background to keep themselves running at an optimal level. It is entirely up to you if you want any of this activity, however. Stopping them will free up resources, although it may make computing less pleasurable. It's a trade-off only you can decide upon.

Assessing The Burden

As we mentioned earlier, there are apps which allow you to identify system hogs. One intriguing third-party offering is Should I Remove It?, an uninstaller that scans your computer, shows you the programs that you have installed and then gives them a rating.

The idea is that you are able to work out whether or not the app is worth keeping on your system based on how others perceive it. Interestingly, there is a percentage bar next to each entry that is designed to show how many users of Should I Remove It? have decided to

uninstall a particular program.

If you decide you don't want a program shown in the list, you can simply click Uninstall. Alternatively, you can select What is it? which brings up a comprehensive page describing the files path, the standard install folder and whether any browser plug-ins are being used. With this information to hand, you can uninstall programs with greater confidence. It's a great use of crowdsourcing to take the guesswork out of uninstalling and it helps to limit mistakes.

For those who want to stick to the tools offered by Microsoft, though, the answer is, once again, the Task Manager. By going to the App History tab, you are able to see the extent each of your opened programs have hogged the resources of your system. It will show you the CPU time it has taken up and its burden on the network but in order to see everything, make sure you click Options and then select 'Show history for all processes'.

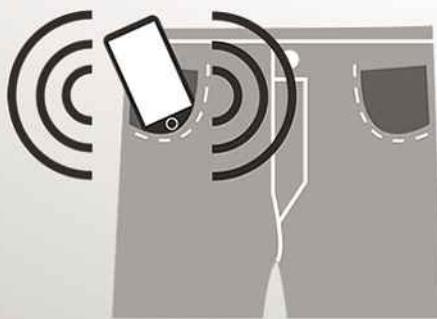


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By analysing which files are taking up too much CPU time, you can decide whether or not you want to delete them. You'll need to do some legwork in case the file is vital to the running of certain programs. Should I Remove It? will help with some of those dilemmas, but there are some signs to watch out for. Anything that is eating up 20% or more of the CPU is worth right-clicking on in order to select Search Online. This option will launch a browser and show you more about the program in question, allowing you to make your decision. Alternatively, just type the name into Google and read up on the numerous forum posts that will, no doubt, have been created about it.

Forums are a great way to work out if a program is safe, and whether or not you need to delete it (don't worry if you see a large CPU percentage for the System Idle Process, though; it is a good thing because it shows there is a lot of spare capacity for you to work with). Even if the program is 100% legitimate, it may not be useful for you. Perhaps it's an old printer program or software related to another device you seldom use any more. One thing is for sure, you will find a lot of obscure looking programs knocking around in Task Manager and you can free up a lot of resources with some careful research and a spot of disabling or uninstalling.

It is also worth mentioning here that there is another Microsoft app that is worth thinking about if you are serious about getting to the root of your slowdown issues. By going to tinyurl.com/olkbkav and downloading the Process Explorer and looking at the details for all Processes (select this under File), you can assess the burden on the CPU and also look at the columns marked private bytes and working set, which roughly equates to virtual and actual memory.

In general, you want the actual memory – the working set – to be higher than the virtual otherwise the system is lacking the necessary RAM to run the program and forcing Windows to use virtual memory to compensate. Data is moved from the RAM to a paging file to free up the random access memory and – given the rule is that the more RAM you have, the faster the computer will run – having more private bytes being used than the working set points to an issue that you may want to explore, perhaps by disabling it.

Browser Add-Ons

It is also worth bearing in mind programs that are linked to other programs and yet could be surplus to requirements. Adobe Flash makes regular checks for updates but it does so via a separate app. You may prefer to check for updates manually as and when the need arrives so removing

Slow iOS Apps?

There is a theory that, with every new update, older phones and tablets become more sluggish in a bid to encourage people to upgrade. It may just be that the new updates are more resource hungry, but if you find that your phone or tablet is sluggish, it's worth taking a look at your apps.

An iDevice uses memory in a different way to computers and the Android OS so the amount of pressure exerted by programs is less. However, if you double-click the Home button and swipe away any open apps, then you may see a small increase in speed (not much, mind). If you then download the Battery Doctor app, you can press a Boost button and reallocate memory.

With iOS devices, though, the fastest apps tend to be those made by Apple itself. The company has access to certain features that third-party developers do not and so using Safari on an iPad should be more efficient than, say, Chrome and Firefox. So use the priority options where possible and don't overload the iPhone with apps.

Some apps are also worth deleting and re-downloading from time-to-time since they can become bloated with data. Go to Settings > General > Usage > Manage Storage to see how much space the various apps are taking up.

Usage		Storage
Used		42.1 GB
Available		13.8 GB
 Photos & Camera		2.0 GB >
 Her Story		1.8 GB >
 Mail		1.3 GB >
 Lost Within		1.1 GB >

▲ You can see how much storage space apps take up in iOS via the Settings

this would enhance your experience, put you in control and reduce the possibility of a slowdown. Similarly, you may find that your web browser is taking a long time to start and runs too slowly. Again, it is likely to be a case of a program infiltrating another program: third-party toolbars and add-ons are regularly problematic.

Indeed, web browsers with add-ons are notorious programs and really can slow machines to a crawl if they are not kept on top of. Partly for this reason, Symantec, which makes the Norton security suite, has a free "unwanted application" app called Norton Power Eraser (tinyurl.com/alxnu6h). It is aimed at removing scamware





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including toolbars from browsers. The program claims its deep scanning can also help solve programs that take too long to start or run on a computer.

There is a manual way to resolve such issues, though. Google Chrome has its own Task Manager, which lets you view the CPU usage and memory consumption of the various add-ons you have for this popular browser. Using this facility, by selecting Menu >Tools > Task Manager, you can view any background-dwelling burdens at-a-glance. Internet Explorer shows the time it takes for browser add-ons to load in the Manage Add-ons section so you can work out which extensions are slowing things down (the offenders can be disabled).

There is also – perversely – an extension for Firefox at tinyurl.com/m2rpstv that allows you to see how much memory various add-ons are using. By installing it and then opening a new tab and typing ‘about:addons-memory’, you can use it to stop the most memory-hungry add-ons from running. Experts suggest using this add-on a few times during a browsing session. If the amount of usage rises substantially during that time, then it points to a problem. You would be better off removing the offending add-on than allowing it to continue to hinder your browsing sessions.

In general, using manual options to halt troublesome apps can be preferable to using security software to do the job, especially since anti-virus packages are also prone to slowing your machine down and are also prone to installing various bits and pieces that hog the resources of the system they’re meant to be helping. We would always advocate using an anti-virus package but you should still be aware that, since it will be constantly monitoring your system for downloadable threats whether on the web, in email or during file transfers, the burden that can impose could be considerable.

According to researchers at AV-TEST, Threat Track VIPRE Internet Security was found to be the worst performer in those terms, followed by Quick Heal Total Security, the Norman Security Suite and Microworld eScan Internet Security Suite. It was better news for the more established names, though. Kaspersky, McAfee and Norton performed their duties with less computer slowdown. The freebies from Panda and Avast were less impressive, though, and AVG AntiVirus Free was within the slower half of the tested packages.

Certainly don’t be tempted to run more than one anti-virus package. Experts have

The PC Decrapifier is a free system utility. The download page features a large 'Download Now' button. To the right, there's an advertisement for 'Download Cleaner for Mac'.

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CCleaner by Piriform	★★★★★	65%

▲ This crown-sourced uninstaller lets you see what others think of your programs in an instant

“ Web browsers with add-ons can slow machines to a crawl ”

long warned against doing this since, as Eve Blakemore, Microsoft’s cybertrust expert, wrote: “The two programs could slow down your computer and they might even identify each other as a virus.” If you have more than one installed, decide which one you want to keep and remove the others. Then run a system scan and

identify any problematic programs that you can remove in their entirety. A good anti-virus package should also be able to spot any straddling files that are causing issues and knock them out of the game as well. Anti-virus packages are a necessary evil but managed well they can be worth their weight in gold.

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Paranoid Android

It's not an illusion. Android phones really do slow down over time. When users download more and more apps, the programs have the ability to eat into the CPU's resources. They can also take up memory blocks of the phone or tablet. It's not all bad, though. Apps that follow the rules of development do not trouble the CPU and the operating system is able to work out when memory is running short, allowing it to stop the offending apps from running in the background.

Even so, good app management is a must. Apps will write to the cache so go to Settings > Storage and tap on Cached data to clear it. Then remove any built-in apps that you don't want. If there are apps in the memory, it is possible to remove them via the multi-tasking screen and swiping them away. You can also do this from the setting screen where you can see the apps that have been downloaded or are currently running. If you want uninstall apps, go to Settings > Apps or Application Manager, touching the app you want to uninstall and tapping Uninstall.

The information screen of apps have Force Stop buttons and you use this page to manage so that they are more effective. You'll be able to see how much storage the app is taking up as well as the amount of data. The data can be cleared and notifications stopped. Notifications are resource-hungry (and can drain the battery) so good management here is vital.

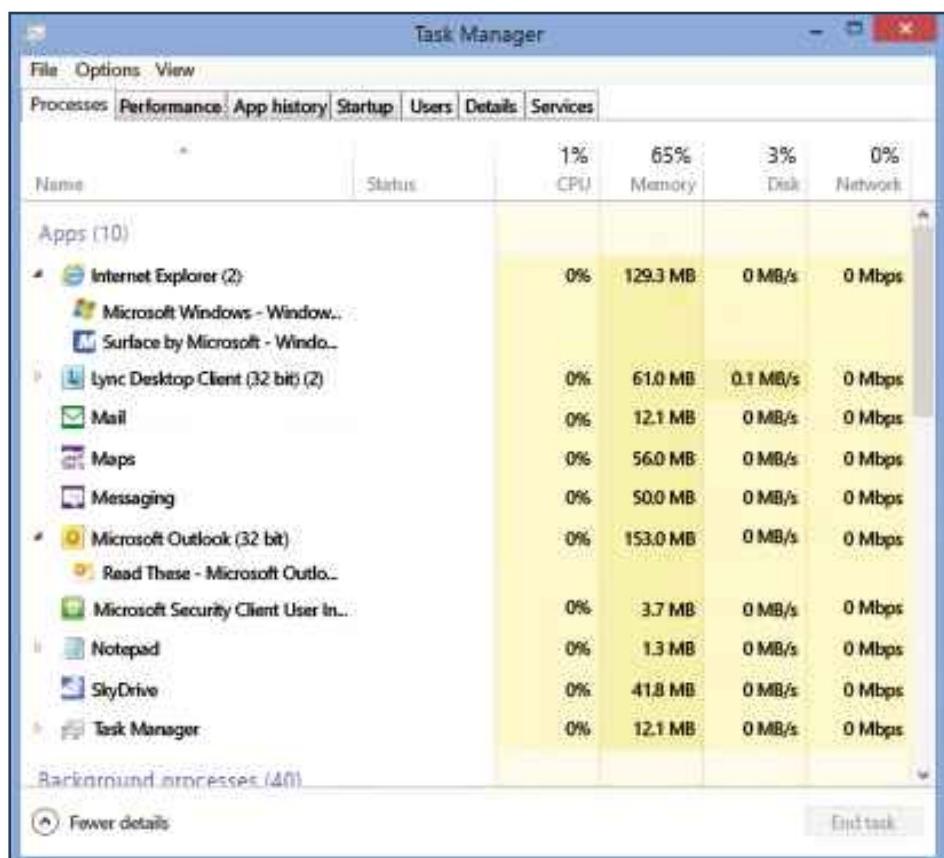
There are also app managers around that have real-time process lists, backup capabilities and CPU usage monitoring. Android Task Manager Pro is among the best. By looking at how resource hungry an app is and determining how useful it is as a program, you can swiftly get to grips with Android, speeding up your devices.

Take Care

Before you start deleting lots of files, though, it pays to take a deep breath and be sure that you're doing the right thing. Of course, we would also recommend that you make a back-up of your data and set a system restore point so that, if the worst comes to the worst, you would have something to fall back on. This will also give you greater confidence to chop and test. It is always worth deleting a small



▲ Skype needs to be always-on if you want people to contact you



▲ The Task Manager in Windows will show up the most resource-hungry programs

number of programs at a time and then checking the impact of your actions before carrying on with your cull.

Even what would appear to be fairly little things, like removing duplicate files using an app such as Glary Utilities' free duplicates finder, can help to relieve the demand on your system by a noticeable amount. Removing large files (perhaps using an app like TreeSize Free) may not have the same impact as clearing up

the software leftovers and clutter, but it certainly can't do any harm providing you're careful about what you're binning.

Just be sure to stay on top of things once you have completed your pruning process or it's all for nought. After all, a tidy computer will keep you going for a good few years – and those components are not likely to wear out quite so fast as your patience in removing a ton of files further down the line. **mm**





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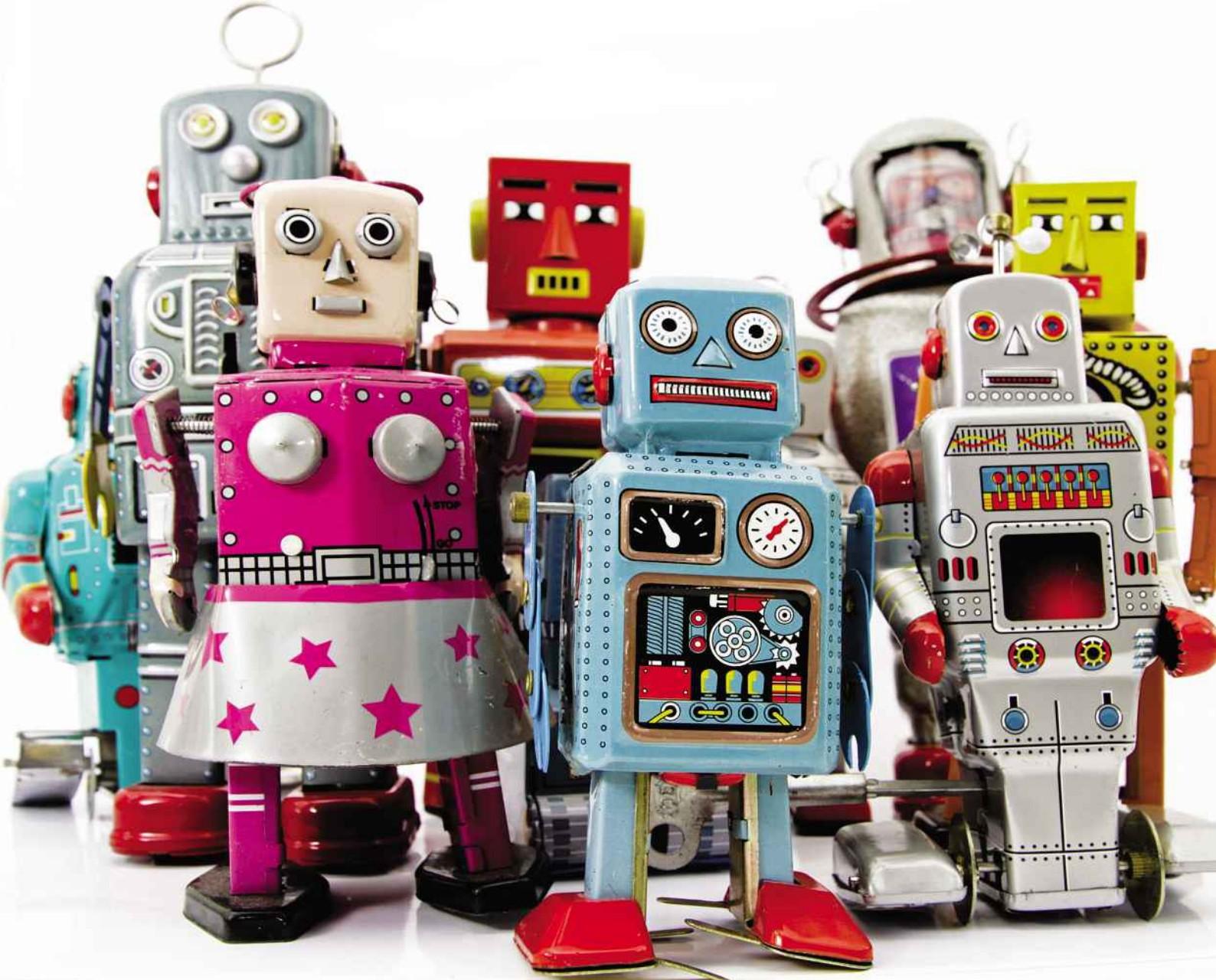


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Rise Of The Robots

David Hayward
looks at the next
generation of
robotics

Robotics is a subject that has always interested us. From watching Robbie the Robot from *Forbidden Planet* to legendary Class M-3 model B9 General Utility Non-Theorising Environmental Control Robot in *Lost in Space*.

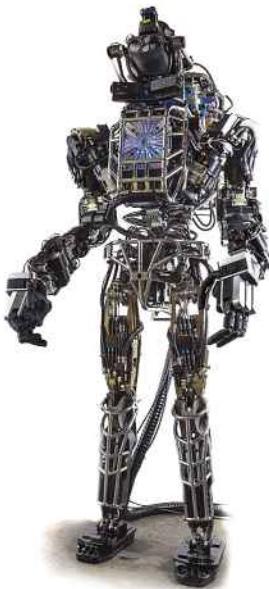
Of course, the vision of robotics back in the 60s and 70s was somewhat different to today. More modern filming techniques have given us grander visions like the *Terminator* films and *I Robot*.

In real life, though, things have been moving forward at an impressive pace in the last decade or so. The mid-90s saw a bit of a lapse in robotics, with nothing startlingly new coming from the technical laboratories of Cal-Tech or Silicon Valley. That did move on, though, with the Honda

P2 appearing in the late 90s and Nasa's PathFinder. Then it stagnated again for a few years. However, a sudden spurt in design, movement in joints and computing power from 2000 onward saw a giant leap in humanoid robot designs.

Take Asimo (Advanced Step in Innovative Mobility), for example. Designed and developed by Honda in October 2000, this is one of the most famous humanoid robots in the world, and it's still going strong considering its age.

The last five years since then have proved to be another quantum leap in robotics designs, most notably the self-replicating robots designed by Cornell University researchers and the more home-centric Roomba robotic vacuum cleaners.



▲ The Atlas robot design, ready to help out in case of a nuclear emergency

Robotics, then, as a credible arm of advanced technology, is moving onward once more, despite Professor Stephen Hawking, Elon Musk and Bill Gates getting a little windy over the rise of artificial intelligence.

Join us as we take a look at a few of the current robotics projects that are being developed and see what we could be heading our way in the near future.

Atlas

Atlas is a humanoid robotics project, designed and developed by Boston Dynamics and funded by the United States Defence Advanced Research Projects Agency (DARPA).

The company was bought by Google in 2013 to help advance its technology, after it put on an amazing display with previous designs such as the BigDog, Cheetah, LittleDog, RiSE and PETMAN. The robotics from Boston Dynamics are designed with safety, search and rescue, and military applications in mind. The BigDog, for example, is designed to be a pack mule for soldiers when in rough terrain, and the PETMAN is a bipedal construction designed to test chemical suits.

Atlas, on the other hand, is a more advanced version of PETMAN. It stands at around six feet tall and has been carefully constructed to allow the robot to move around almost any terrain, much like a human. This means it's ideal for search and rescue missions, where the arms need to be free to manipulate or carry something (or someone), while the legs provide the motion.

It's also being fitted to be able to function as a repair robot in situations where it's impossible for a human to survive – for



▲ The Atlas upgrade now features a battery and better motors

example, a Fukushima or Chernobyl-like nuclear disaster zone.

In theory, we send in a robot, and we'll be able to remotely repair or shut off whatever may be causing a radiation or dangerous chemical leak, without any rescue personnel being in harm's way.

The robot's specifications make for a fascinating read. It has two arms, two legs,

a torso, a head, 28 hydraulically actuated high performance joints with closed loop positioning and force control, an on-board real-time control computer, crash protection system, modular wrists that can be fitted with specialised hands, a head-mounted sensor with LiDAR (Light Detection and Ranging, a laser targeting system for measuring distance and light), stereo cameras and a special set

“In theory, we send in a robot, and we'll be able to remotely repair or shut off whatever may be causing a radiation or dangerous chemical leak”



▲ DRC-Hubo was the winner of the DARPA Robotics Challenge



▲ When needed, it can drop to its knees and move around on wheels



▲ The rather disturbing-looking Albert-Hubo

of perception algorithms to help the robot discover and analyse its current environment.

Recently, Atlas received an upgrade to its wrist joints, allowing it to be able to open doors by turning the handle, and an added battery pack that will allow it to roam freely without tripping over its power cord – or cutting it, as it did earlier in the year.

The 3.7kWh lithium-ion battery will limit Atlas to around an hour's use in the field, which includes tasks such as walking up stairs, carrying a heavy load and tool use. The hydraulics, though, have been upgraded with a new variable pressure pump, which will help save the battery life somewhat by allowing the controller to apply light to mid-level pressure for most normal duties, then upping the pressure to maximum for heavier tasks.

Atlas was one of the finalists in the Darpa Robotics Challenge competition in 2013 – a competition that's designed to test the future of robotics for use in challenging environments that require robotic assistance.

Although the competition that year was ultimately won by a robot called Schaft, a University of Tokyo robot (incidentally, also owned by Google), Atlas seems to have come out of it with a little more renown – probably because the winner, Schaft, looked more like a walking cash machine than the more humanoid design of Atlas.

Nevertheless, robotics has once again become the buzz word that's on the collective lips of the media and those who

when needed, the robot could stand up again and become bipedal for whatever task was necessary.

This was the winning factor for the Korean team, as Jun Ho Oh, a professor of mechanical engineering said, "Bipedal walking on robots isn't very stable yet. The slightest thing goes wrong and the result is catastrophic."

To increase the stability, then, as well as allow the robot to function properly in a humanoid environment, the team minimised the risks of Hubo falling over by simply adding wheels on the knees and letting the robot drop to them when faster motion was required.

“Let’s just enjoy the idea that robots are here to help humanity advance into the next few decades and to aid us in our exploration of the unknown”

think that Ultron or the Terminator are but mere years away from becoming our robot overlords. And we have Atlas to thank for that attention.

DRC-Hubo

Moving on from Atlas, DRC-Hubo is this year's winner of the Darpa competition. This is a design from a team hailing from the Korea Advanced Institute of Science and Technology (KAIST), and it's quite unique in the way it functions.

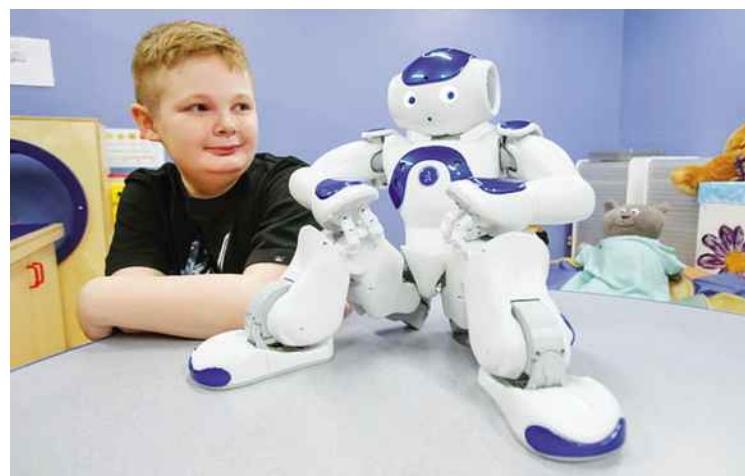
Rather than opting for an all-out bipedal robot, the team instead focused on DRC-Hubo's ability to semi-transform into a wheeled robot by kneeling down. Then,

DRC-Hubo is a little shorter in stature than Atlas, standing at just 5' 3" and weighing slightly less too. However, it does have a better operating battery life, at just over two hours. Furthermore, Hubo has three cameras set up in its head, allowing it to perceive objects in 3D, as well as an advanced LIDAR type system to judge distances.

There are seven motors and seven motor drivers controlling the arms, which gives the robot a more human-like manoeuvrability and dexterity. And of course, not only can it walk on two legs, but it can traverse a flat surface on its knee-wheels at a speed of around 2km/h – so don't worry, it's not going to be chasing after us just yet.



▲ MEDI is designed from the Nao robot and is used to help children deal with pain and hospital procedures



▲ So far, MEDI has proved successful, and anything to help children in hospital is surely a good thing



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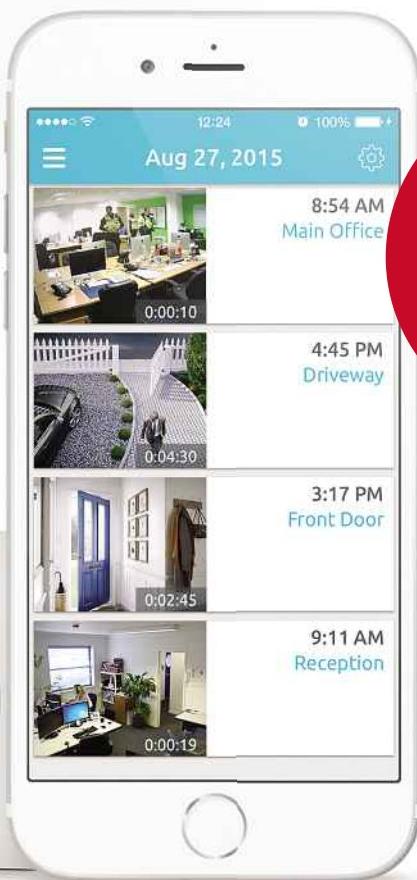


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▲ This is the Actroid-SIT, not a young lady as you would first expect

DRC-Hubo is the latest Hubo-based model to come from KAIST, with former versions (the KHR-0, KHR-1, KHR-2 and Hubo 2 and 2-plus) advancing from one generation to the next in terms of the processing power, as well as the mechanics. Oddly, there's also an Albert Hubo version, which has a body much like that of Honda's Asimo and a rubber head of Albert Einstein.

The next-generation model of Hubo is currently kept under wraps by KAIST. Since winning the Darpa competition and the subsequent \$2 million prize fund along with it, the team has been accepting funding and donations of time and resources from a number of technology groups, research centres and mechanical institutes. What the team will come up with next isn't clear, but we're fairly sure it's going to be pretty hard to beat.

MEDI

Moving away from the rescue and military applications of robot design, we now look at MEDI, a 23" tall mini-robot that is designed to act as a pain coach for children in hospitals and doctor's surgeries.

Deployed by RX Robots, MEDI is designed to be as toy-like as possible while still having a high degree of technology on hand. The idea is simple enough: MEDI is able to perform a number of functions such as dancing and singing, and it can converse to a limited degree with a child regarding the procedure they're going to have performed on them.

For example, if a child is about to have a blood test, MEDI will talk to the child and ask if it's okay for him/her to sit with them and explain what's going on, while showing

Other Notable Modern Robots

Aside from the three robots we briefly looked at here, here are a few more notable projects to track down:

THORMANG: Designed by the Seoul National University, THORMANG is a humanoid robot designed for rescue and repair in hazardous situations.

BugBots: These are water-hopping-insect-inspired micro-robots are able to walk on water just below the maximum force that the water tension can withstand.

iCub: the iCub is created by the RobotCub Consortium, made up from several European universities. It's a humanoid design but with a very scary baby-looking head.

Poppy: Poppy is a 3D-printed robot with an articulated spine, with five separate motors and a further 20 motors to help move the limbs of its humanoid design. Also, it's only 84cm tall.

Romeo: Romeo, which sounds a little dodgy for a robot, is designed as the next generation in personal care. It's about 1.4 metres tall and is designed from the Nao.

Actroid-SIT: Probably the scariest of the bunch here. Actroid-SIT is a female android that is capable of interacting with you, shaking your hand and answering a limited amount of questions. If you fancy being creeped out a little, then look it up.

empathy toward the child during the test. It's actually quite a fascinating robot.

MEDI looks a little like Twiki from *Buck Rogers*, but is actually another robot called Nao, designed by Aldebaran Robotics. The difference here is that RX Robots have loaded a Nao up with cognitive-behavioural software so it can interact better with children.

MEDI, or the Nao core if you prefer, is made up of a 25 degrees of freedom with actuated limbs, accelerometer, gyrometer and four ultrasonic sensors. In addition, there's also a pair of HD cameras, four microphones, a sonar rangefinder, two infrared emitters and receivers, nine tactile sensors and eight pressure sensors.

MEDI is actually a little more home-based when it comes to the processing involved, as it uses an Intel Atom 1.6GHz processor with 2GB of memory and a 512GB SSD – with further expansion available. It runs a Linux-based operating system called NAOqi 2.0, but it can be controlled and interacted with using Windows or Mac OS if needed.

The lithium-ion battery is capable of running MEDI for around 90 minutes, with walking, talking and manipulating of its arm movements. If it's just sitting still and interacting with the sensors and 'speaking' to the patients, then that time is extended to well over a couple of hours.

According to clinical studies, with MEDI being in operation in a children's hospital in Alberta, Canada, interaction with MEDI can result in a child feeling up to 50% less

pain than if an adult nurse or doctor were talking to them. Naturally, there's an element of fascination here, which is a distraction technique for the child in question. But hey, if it works and the child doesn't feel quite as much pain or is a lot more comfortable in a hospital, then it's worth every penny.

Robots And Empire

As you can well imagine, robotics isn't going to fade away anytime soon, but with this new generation of robotics comes something that's not so pleasing to read about.

Autonomous weapon systems are now the questionable mechanics of the day, with land-and sea-based projectile weapons, capable of wiping out something from a range of a few miles away, not to mention drones crowding the skies with their ever watchful cameras. It's no surprise that conversations over the rise of the killer robot are never far away.

Should we ban autonomous weapons? Do drones need to be removed from over civilian populated areas? Then again, if warring with robots reduces human casualties, should we ban their use in modern warfare?

There are too many questions to answer in this small segment, but nevertheless they'll keep the media going for a while with talk of a robot-led Armageddon.

For now, let's just enjoy the idea that robots are here to help humanity advance into the next few decades and aid us in our exploration of the unknown. **mm**



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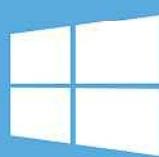
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Code With AI2

Sketch (Part 1)

Build an Android sketching app with David Briddock

Over the last few issues we've used App Inventor 2 (AI2) to build a useful timer, a dice shaker, a web browser and display PPI calculator. This time we'll take an introductory look at the Canvas component and in the process build a simple sketching app. Remember, all you need to play along is a Windows/Mac/Linux PC, web browser and Google account. Ideally you'll also have an Android smartphone or tablet for testing.

What We'll Learn

By making use of AI2, specifically its canvas component it's easier than you might think to create a simple yet functional sketching app that runs on any Android smartphone or tablet.

Along the way we'll use a horizontal layout and take advantage of the slider control component.

Starting AI2

In your browser navigate to the AI2 home page (ai2.appinventor.mit.edu) and sign in with your Google account.

We need a new project so in the Projects menu select the 'Start new project' option and give it a meaningful name, such as 'MMSketch'.

Screen Properties

We're automatically taken to the Designer View where there's already a component called Screen1. We'll drag and drop the other components onto this screen.

To the right of this you'll find the Properties panel for the currently selected component. In this panel ensure the AppName is set to 'MMSketch', then set the Title to 'MM Sketch' and the ScreenOrientation to Portrait.

Now we'll add some screen components.

The Canvas

To capture our oh-so-arty pencil strokes we're going to use the aptly named Canvas component. This already has a rich collection of graphical behaviour built into its block collection, which means creating a sketching app with it is a relatively simple process.

From the lefthand side Palette panel click on the group called Drawing and Animation. Now drag and drop the Canvas component over to the Screen1 area in the Viewer panel.

With the Canvas1 component selected over in the Properties panel set both the Height and Width to the 'Fill parent...' option, then set the PaintColor to a pencil-like DarkGray.

Horizontal Layout

In part two we're going to enhance this app with some additional screen components. They'll be positioned next to each other along the top of the screen, so we'll need a layout component.

From the Layout group select a HorizontalArrangement, drag it over to the canvas and position it at the top of the screen. A blue bar appears to indicate its drop position.

With the HorizontalArrangement1 component selected go over to the righthand side Properties panel and set the Width property to the 'Fill parent...' option.

Slider And Button

For added flexibility we're going to offer a pencil line thickness adjustment feature. This gives us the opportunity to use a new component, namely the slider control.

From the User Interface group grab a Slider component, drag it over to the canvas and position it to the lefthand side of the HorizontalArrangement. Once again a blue bar appears to indicate its drop position. With the Slider1 component selected rename it to 'LineWidth'. Then over in the Properties panel set the MaxValue to '25.0', the MinValue to '1.0' and the ThumbPosition to '5.0'.

```

when Canvas1.Dragged
  set [Canvas1. LineWidth] to ( [Slider1 v] )
  call [Canvas1. DrawLine v]
    [x1 v] get [prevX v]
    [y1 v] get [prevY v]
    [x2 v] get [currentX v]
    [y2 v] get [currentY v]
  end
do
  call [Canvas1. Clear v]
end
when AccelerometerSensor1.Shaking
do
  call [Canvas1. Clear v]
end

```

▲ AI2 blocks view

Accelerometer

We want to be able to clear the canvas. We could use a simple button for this. But instead let's use a shaking motion as captured by the accelerometer sensor.

Open the Sensors group in the Palette panel, grab an AccelerometerSensor component and drop it into the screen area. Notice it appears just below the screen in the non-visible components list, as well as in the Components panel.

Sketching Code

It's time to start coding, so click on the Blocks View button located on the green bar. The canvas component has a handy event that captures the movement of a dragged finger (or stylus). This is what we'll use to turn finger movements on the screen into sketch marks.

In the Blocks panel select the Canvas1 component, then grab a brown 'when Canvas1.Dragged' block and drop it into the coding area. Now we need to populate the inner 'do' space. Before making a mark we'll set the line thickness, just in case the slider control has recently been moved.

Back in the Blocks panel select Canvas1, grab the green 'set Canvas1.LineWidth to' block and snap it into place inside the brown block. The value is set with a light green 'LineWidth.ThumbPosition' from the LineWidth component, which is snapped onto the end of the green block.

Now to draw the line itself. From the Canvas1 component grab a purple 'call Canvas1.DrawLine' block and drop it underneath the green block. To set its four values we need the attributes we see listed in the parent brown 'when Canvas1.Dragged' block, namely 'startX', 'startY' and so on.

To set 'x1' hover over the 'prevX' attribute, locate the 'get prevX' block, then simply drag this block and snap it next to the 'x1' label in the purple block. Repeat the process for 'y1', 'x2' and 'y2' using the items 'prevY', 'currentX' and 'currentY' respectively.

Screen Clear

Now we need to set up a way to clear the canvas. In the Blocks panel select the AccelerometerSensor1 component, then drag and drop a brown 'when AccelerometerSensor1.Shaking' block over to the coding area.

Handily, all we need to define this behaviour is a single block. Go back to the Canvas1 component, grab a purple 'call Canvas1.Clear' block and snap it inside the brown block.

That's the coding done, then. Ensure the warning and error counts in the bottom left corner are both zero then carefully check your code against the Blocks View image.

Test your app using the AI Companion App installed on an Android device (as we discussed earlier in the series).



▲ AI2 App

Going Further

This is a pretty basic, but there are lots of ways we can enhance it; a colour choice would be good, or a way to save the sketches, perhaps? We'll turn our attention to both of these next time, when we enhance the app with a spinner control colour selector and add a save button as well. **mm**

Remembering... Sega Master System

This week, we recall one of our favourite early consoles

The 80s were a time most remembered for the ZX Spectrum, BBC Micro and Commodore 64, especially in this country. The consoles, although we didn't really call them consoles at the time, had been around for many years beforehand, but it wasn't until later in the 80s that something a little different came along.

The likes of the Atari made for excellent lightweight gaming units, but when 1987 arrived, along came the Sega Master System. This unique, odd-shaped box of tricks was actually superior to the hardware inside the already available Nintendo NES, although it didn't do as well commercially.

It was an 8-bit console, using an NEC 780C, which was based on the popular Zilog Z80 (as used in the Spectrum), running at 3.5MHz, along with 24KB of memory, 8KB of XRAM and 16KB of video RAM.

It had a Sega VDP (Video Display Processor), up to 32 simultaneous colours (16 for sprites and 16 for background) and could – if you knew how to trick the programming – display up to 64 colours.

It was a cartridge and Sega card based system, with the cartridges having a storage capacity of around 500KB and the cards a much lower 30KB. Impressively, programmers managed to squeeze some amazing games into these storage devices.

Who here can fondly recall the likes of *Rampage*, *Alex Kidd in Miracle World* and *Spy vs. Spy*? There was even a set of 3D glasses available for playing *Space Harrier*. And, of course, there was the greatest piece of hardware: the light gun and *Safari Hunt*.

Its History

The Master System was actually the third of Sega's consoles, hence its original launch name of Sega Mark III.

Its predecessor, the SG-1000 II was very popular in Japan, Australia and the US, and although it did make it to our shores, it never really got the same kind of foothold that the Master System some years later.

The idea behind the Master System was to create a home console that could pick up from the downturn of the arcades, with Sega being hit quite hard when the majority of people stopped frequenting arcades. The SG-1000 II and the very first Sega console, the SG-1000, were very similar in both design and specifications,

Did You Know?

- Korea, which didn't have the best relations with Japan (apparently) removed all references to samurai from the games and tried to make them more 'Korean'.
- Alex Kidd was the Sega mascot before Sonic eventually took over.
- Worldwide, there were about 13 million units sold.
- The section that developed the Master System for Sega were referred to internally as the 'Away Team'.

but it was the Master System that nailed it in terms of offering the best under-the-TV entertainment unit for the masses.

After a few years of relatively okay success, the company moved into the 16-bit era and, as we all know, this meant the launch of the massively popular Sega Mega Drive (or Genesis, depending on where you're from in the world).

A short time after, the Master System II was released, when the Mega Drive was still being sold. The Master System II looked completely different to the original and removed some of the unused hardware, such as the expansion port and card port.

The Good

The light gun, the colourful and bubbly games, *Ultima IV – Quest of the Avatar*, and being sold for less than £100 when first released.

The Bad

Poor wrist aching controller design, the light gun wasn't always accurate on bigger TVs (that's our excuse), and it had the tendency to get a little hot with extended use.

Conclusion

It was the Master System that really started off my life in the world of the console – and it was the Xbox One that finished it.

There was something innocent and appealing about the Stealth Bomber-like shape of the Master System and, quite frankly, I don't think I'll ever love another console quite like I did this one.



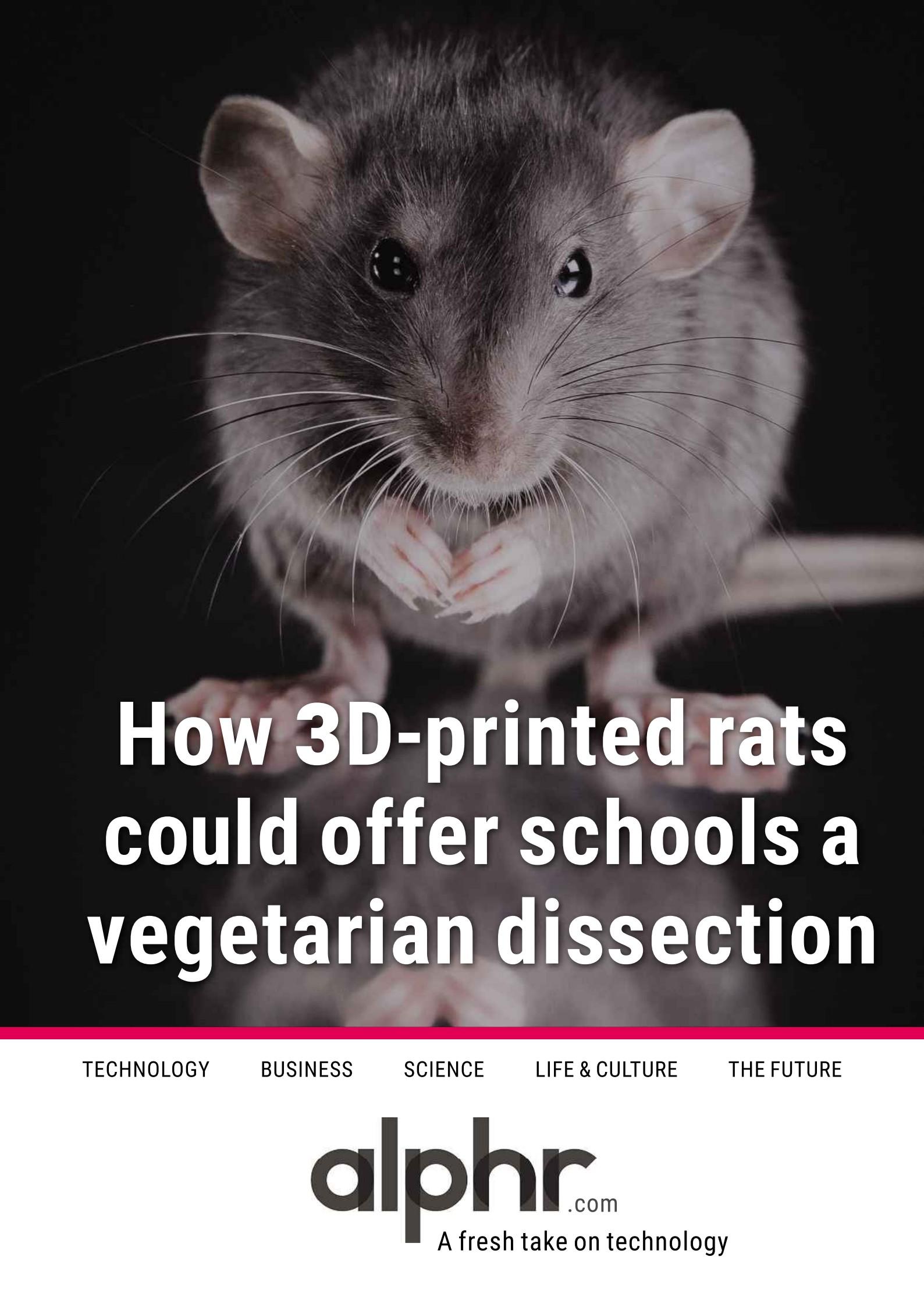
▲ The Sega Master System. What a beautiful machine



▲ The Light Phaser was a great hardware extension for a young teen



▲ There were some excellent games available. Those were the days...



How 3D-printed rats could offer schools a vegetarian dissection

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Top 5

Weird Tech Fixes

When things go awry, here are a few of the stranger solutions that actually work (sometimes)

1 The Whack

Although this practice probably isn't as effective as it was in the days of CRT monitors and TVs, it's still the case that if your tech isn't working and you've tried everything else, you might as well try giving it a slap. Why this sometimes works is a mystery, but even if it doesn't, it offers the added bonus of giving you a way to vent your frustration. Just remember, if you're using the whack technique, try not to hit anything that might break off, and don't blame us if it does.

2 The Restart

The classic 'turn off and on again', basically. If you've been using a PC for a while, errors can creep in, so it makes sense that restarting the OS could help remedy those problems. Why, though, does this work with things like modems and routers? If your internet has been functioning just fine all day or even all week, why, without any direct intervention from you, does it just stop working? We're honestly not sure, but as long as it works, we're not sure we care too much.



◀ If this happens, it's possible you hit it too hard

3 The Reseat

Because desktop PCs are modular, it's important that the components are inserted correctly, so a good connection can be made between them and the motherboard. That's fair enough, and it figures that if a graphics card, for example, isn't inserted properly, it likely won't work, and you'll suffer all kinds of problems. The reseat, of course, is the fix, but how did the component even get loose in the first place? We suspect supernatural forces might be at work, but it's also possible that gravity could be involved.

4 The Dust Blow

Although this does sometimes work with PC parts, it's more of a cartridge media solution. Anyone who owned a cartridge-based games console will know that every so often games would refuse to load until you took them out of the system and blew into them, before putting them back in the machine. Again, we have to wonder how the dust got in there when the cartridge was inserted, but it did work. The only problem with this fix was trying not to cover your games in saliva, which oddly enough, they didn't seem to like.

5 The Press Everything

This is particularly handy if you've lost the user guide for a piece of hardware and you have no idea how it functions, but it can also work in other situations. For example, if your phone or computer has frozen up and the usual things like Ctrl+Alt+Del don't work, attempting to press every single button you can reach with ten fingers and ten toes might well be just the solution you're looking for. Of course, you might also make things worse, so again, please don't blame us.

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Component Watch

If you want to watch TV on your PC, you'll be A-OK with one of these...

On-demand video is making entertainment easier to access TV shows on your PC than ever before – but you still can't beat a standard television sometimes. However, turning your computer into a TV is easy to do with these affordable upgrade options, both USB and PCI-based. All you have to decide is which suits you best!

Deal 1: WinTV Nova-T Stick

RRP: £35 / Deal Price: £24

Designed as an easy way for you to watch Freeview Digital TV on your PC or laptop, the WinTV Nova-T stick is a basic unit. Despite that, it offers sharp pictures and sound, as well as direct-to-MPEG2 recording so you can fill your hard drive with your favourite shows. With full support for Microsoft Media Center, it even receives non-DAB radio. As it's Freeview-based, there's no extra fees or subscriptions involved, but you will need an aerial to use with it. A rooftop model is ideal, but indoor ones work too under the right conditions. It's not the most sophisticated piece of kit you'll come across for this purpose (as we'll soon see), but even at this price it's likely good enough to get the job done!

Where to get it: Stuff-UK (bit.ly/1NFWkhz)



Deal 2: PCTV 73E

RRP: £45 / Deal Price: £37

While the WinTV stick required an external aerial, the Hauppauge PCTV nanoStick is specially designed to boost weak digital signals with its ultra-sensitive reception technology and mini-antenna, though it can be connected to your house's rooftop receiver if that's how you want it to work. Its compact, low-power design potentially makes it perfect for laptop users on the move, but it works with any USB-capable system no matter what the form factor. The bundled software lets you timeshift broadcasts and records direct to DivX format, as well as stream content to other PCs on your network. Ideal for portable or desktop use, and available now at a fantastic discount.

Where to get it: Ebuyer (bit.ly/1UXolQA)



Deal 3: WinTV Nova-T 500

RRP: £80 / Deal Price: £53

The WinTV Nova-T 500 is low-profile internal card aimed at media centre and HTPCs. It distinguishes itself with its dual digital receivers, while its direct line to the PCI bus and on-chip decoder means it'll leave your CPU's load almost entirely unscathed. Internal receivers are generally more expensive than USB ones, but you're paying for quality, and the Nova-T 500 has that in spades.

Where to get it: Pixmania (bit.ly/1YgahX0)



Deal 4: WinTV Nova-TD Stick

RRP: £67 / Deal Price: £56

The Nova-T's bigger brother also offers two digital TV tuners, so you can watch two channels at once, record one while you watch another, or combine the signals from two aerials for the best, strongest picture. It even comes with a remote control, so if you find yourself fighting over the remote with your family members, this is exactly what you need to settle arguments for good – and, as you'd expect, it's got all of the usual features wrapped into an easily portable USB stick.

Where to get it: Nigel O'Hara (bit.ly/1MsQNL7)



Deal 5: TBS 6281 Dual Freeview HD card

RRP: £100 / Deal Price: £93

The TBS 6281 is another low-profile internal card, but this one has a pair of HD-enabled inputs which are compatible with DVB-T/T2 free-to-air digital channels, including Freeview HD, giving you high-definition broadcasts straight to your PC. It only needs one aerial input and comes with both low-profile and full-size backplates for PCs of all sizes. It's even got an RF pass-through so that you can redirect the signal to other devices. What more could you want?

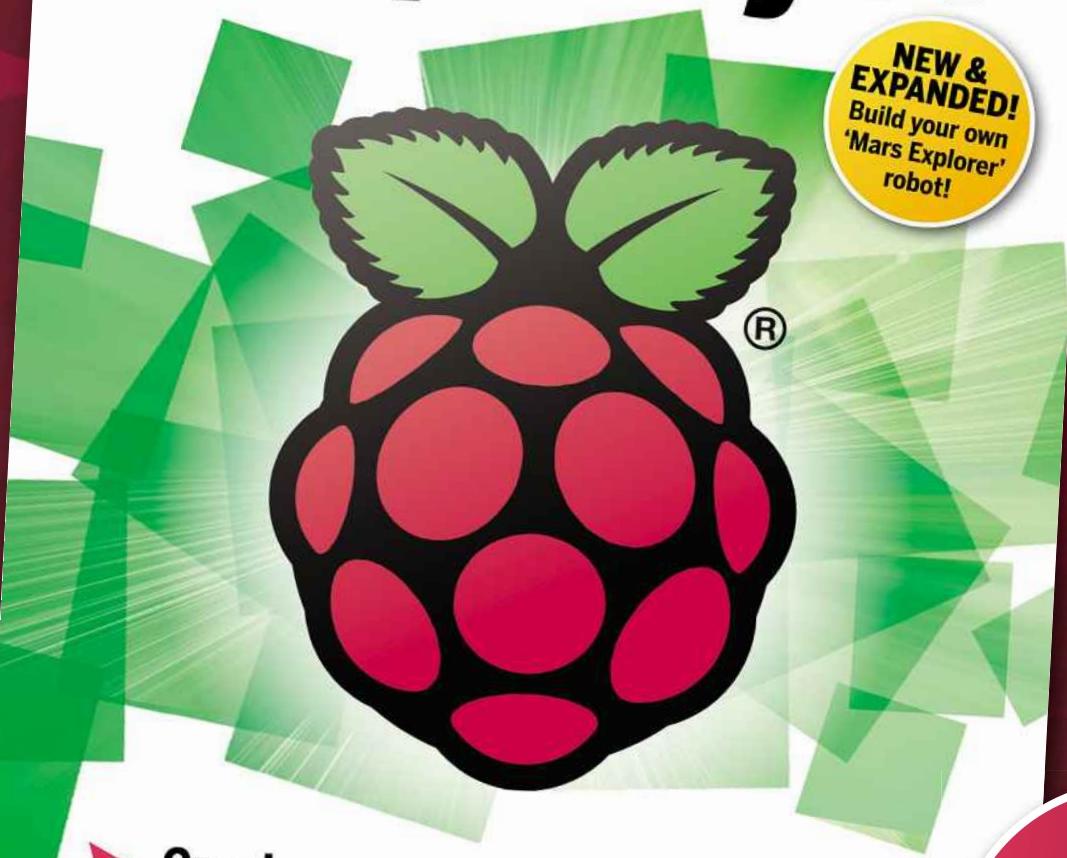
Where to get it: CCL (bit.ly/10hjMln)



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Game On!

Android Pay Lands In States

Apple Pay has more competition

Not wanting to leave Apple holding the mobile payments market, Google has launched its own version – Android Pay – in more than a million locations in the United States.

It's not a huge surprise, given how the market is on the rise, and Android Pay will be available to smartphones with NFC and Google's KitKat 4.4 OS (or greater). Android users will be able to store credit card details on smartphones alongside loyalty card data and the like. Retailers supporting the system include McDonald's, Macy's and Bloomingdale's, so users will be able to buy

a lot of fashion clobber before then dripping tomato sauce all down it.

Card providers in support of this include MasterCard, Visa and American Express, and we have no idea when, or even if, Android Pay is coming to the UK and other markets.

In other Apple Pay news, it's now most recently supported by Lloyds and Halifax banks, which means Barclays is the only major UK banking institution yet to climb aboard the mobile banking system, choosing instead to use its own bPay system for the moment. How long will it hold out for? Consumer pressure might make all the difference.



Retro Gaming Night returns to Cambridge

Okey, you're going to have to be quick to take part in this, but the Centre for Computing History is inviting people to its Retro Gaming Night on Friday, 25th September. Yes, we know that's the day after this issue hits newsstands.

This bring-your-own-beer event is a strictly over-18s affair, and as spaces are limited, booking is really required to make sure your name's down on the list. With any luck,

though, there will be some spaces left by the time this issue is out. Heck, you might even be lucky enough to buy a ticket on the door (for £2 extra – pre-booked price is £8).

The night is in aid of supporting the hard work of the centre itself, and it's a 7pm till midnight event – hence the beer. If you do get to go, please let us know how it went. Consoles and classic games aplenty will be at your disposal – and yes, we are jealous.

Apple Launches iPad Pro

It's big, it's powerful, and it's probably going to be obscenely expensive

What do you do when you want to shake up your tablet sales? Make them bigger, of course.

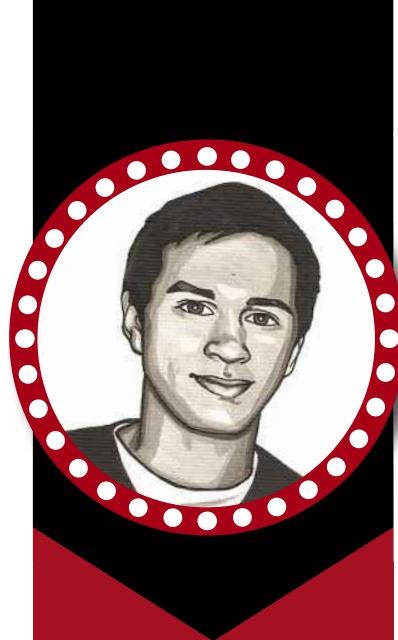
Apple's latest 'Special Event' in September saw the unveiling of a bunch of products, as you'll be all too aware of by now. Among all the hollering and whooping and, erm, on-stage performance from One Republic, Apple showed off its new iPhones, a revamped Apple TV that would also provide gaming (of sorts) and some new watches.

We're most interested in the iPad Pro, though, as this big fella, pitched at serious tablet consumers, could be a huge threat to Microsoft's Surface tablet. Apple is claiming desktop-class performance with this one, in essence providing its consumers with an alternative to the MacBook. Looking at the spec, this 12.9" Retina display beast promises double the CPU performance of the iPad

Air 2, 5.6m pixels and a brand new chip, the A9X. This third-generation chip has 64-bit architecture, and the tablet also comes with a Smart Keyboard add-on – a full-size board that's fully portable and connects via a Smart Connector.

How will this do this Christmas, and will it succeed where the Surface failed? Microsoft will be keeping a watchful eye out.

UK pricing has yet to be announced.



Trying to work out why your PC is suddenly slower than it used to be can be a real challenge. Of course, by using your computer, filling it up with programs and data, you're making it less agile, and slowdowns will naturally happen over time. But sometimes, you experience the kind of slowdown that's just a little too dramatic and out of the blue. That's when you need to think about finding a solution.

One of the worst causes, of course, is malware, but if you're not sure, that means doing lots of often very slow virus scans.

If malware isn't the culprit, it could be some other kind of software problem that's dragging your PC back.

However, there's another important possibility to consider: hardware failure. I know from my own painful experience that a dying hard drive can make a PC slow down significantly. It doesn't happen that often, of course, but it's definitely worth bearing in mind, particularly if it reminds you to back up more often, like we do(n't)

Until next time,

Anthony

Editor

Meanwhile... On The Internet...

The story of Ahmed Mohamed has been the internet cause célèbre of the last week without doubt. Powered by the hashtag **#IStandWithAhmed**, the story of the 14-year old muslim boy arrested by Texas police after a homemade clock was reported as a potential bomb by his school's staff, quickly spread – along with pictures of an obviously confused, concerned and handcuffed young man in a NASA T-shirt (tinyurl.com/MMnet81a). The momentum behind the story quickly grew, in a way that only modern social media and geek fury can fuel, and the spotlight of internet analysis quickly turned on the staff at MacArthur High School, Irving – and the town's police – questioning their course of action and the motivations for it (tinyurl.com/MMnet81b).

Many commentators and commenters chose to see it as racial profiling and evidence of Islamophobia in America (tinyurl.com/MMnet81c). Indeed, it's hard *not* to see it like that when the police themselves admit that they handcuffed and took the boy away despite quickly coming to the conclusion that the circuitry and display wasn't a bomb (tinyurl.com/MMnet81d), and saw fit to arrest him for simply for carrying electronics around (he, apparently, made no threats or intimations that what he was carrying was anything other than what it was, which makes the idea that he was arrested as a hoaxter confusing). It wouldn't be the first time that technology has come under suspicion in these security obsessed times, though (tinyurl.com/MMnet81e)

Reading the school's non-apology for the whole affair only makes it worse, in all honesty (tinyurl.com/MMnet81f), so it's not surprise the boy has declared his intention to leave as soon as possible. This one, we suspect, will run for quite a while. Though whether the soul searching over the matter that's currently happening online will extend as far as those responsible for Ahmed's arrest is less certain. For now, he seems to be taking well to his new-found celebrity with aplomb – a profile hike that has seen him receive invitations to the White House (tinyurl.com/MMnet81g) and a whole host of high-tech events (tinyurl.com/MMnet81h).

We've covered the excellent work of 8-bit cinema many times before. However, we have no problem mentioning it again, seeing as the talented brains behind it have lovingly recreated one of our favourite movies (though not everyone's: tinyurl.com/MMnet81i), Ferris Bueller's Day Off, for its latest project (tinyurl.com/MMnet81j). Our affection for this is only heightened by the chiptune versions of *Danke Schoen* and *Twist And Shout* that adorn the soundtrack, as is only right and proper (tinyurl.com/MMnet81k).

.AVWhy? Videos For Your Eyes... Not Necessarily For Your Brain

We suspect that, at some point, we've all lost a camera. It happens. If you're lucky, you sometimes find them again or they get returned, and the pictures can be viewed as some kind of strange time capsule to what was happening when you got misplaced it in the first place. We suspect, though, that they wouldn't compare to the footage of the Grand Canyon found on this recently re-discovered Go Pro camera. A camera that was sent to the edge of space below a weather balloon by Stanford University students, lost for two years, and eventually found by a hiker (tinyurl.com/MMnet81l).

Twitter's decision to block Politwoops' access to its API (tinyurl.com/MMnet81m), and thus defeat the site's attempts to preserve the deleted tweets of politicians across the globe seemed a bit mean in our view (and was questioned by many others, on the grounds that public officials shouldn't be judged by the same standards as members of the general public: tinyurl.com/MMnet81n). It was, however, a decision that no-doubt suited the service's attempts to court its higher-profile users and keep them using it as a mouthpiece in an increasingly competitive social media market.

It doesn't mean that the work it's done over the years is lost forever, though. Yes, the venerable Internet Archive has stepped in to host a database of 1.1m deleted tweets in perpetuity (tinyurl.com/MMnet81o). Good on 'em.

As many people will tell you, Douglas Adams' *Starship Titanic* graphic and text adventure game is far from perfect (tinyurl.com/MMnet81p). We have vivid memories of adventure game from our younger days, though (we weren't as young as we like to think we were, however), and news that it has been bought back to life by GOG.com (tinyurl.com/MMnet81q) gave us a warm blast of nostalgia that improved last week considerably.

If the measly £4 it's asking for a DRM-free version it is sounds a little too much for you, maybe a browse around the game's inexplicably still-there website (1998 Vintage, no less) will convince you to part with your cash. If not, you could always try the free in-browser version of Infocom's classic *Hitchhiker's* text adventure available on the BBC site (tinyurl.com/MMnet81r). That was a massive seller in the mid-80s (around 400,000 copies, apparently) that is still as tricky as it always was. Unless, that is, you have a walkthrough: tinyurl.com/MMnet81s... But you wouldn't want one of those, would you?

You could always play both, of course; just make sure you have your wits about you, and lay off the pan-galactic gargleblasters...

Aaaaaaaaaaaaaand Finally...

In a world where you can order virtually everything with the click of a button, even your food, it's easy to forget just how much work goes into even the simplest of things. That's one of the reasons why the How To Make Everything YouTube channel's video explaining the six-month, \$1500 process that turns raw ingredients into a tasty chicken sandwich is so fascinating (tinyurl.com/MMnet81t). Be warned, though, it's not always appetising.





This man's problems, which made up issue 1379's caption competition, obviously tickled you funny bones. To wit:

- **JayCeeDee:** "Typical! The wife's just given up smoking and now her laptop's started."
- **Thomas Turnbull:** "This pub sim must be from the 90's, there still smoking in the bar."
- **pesukarhu:** "SteamOS beta testing!"
- **JayCeeDee:** "Ted's memory was failing quicker than his laptop's – he couldn't remember where the fire bucket was."
- **Thomas Turnbull:** "I'm running to the river, I need water cooling immediately."
- **Frank Everett:** "Hey! This new laptop is smokin' hot. No Really, call the fire brigade! Quick!"
- **JayCeeDee:** "Forum Flame War claims first victim."
- **Geoff Taylor:** "The Hotmail servers were working at full pelt!"
- **Think Tank:** "Check out DirectX 12's real time 3D smoke effects."
- **JayCeeDee:** "I knew I should have used Chrome instead of Firefox."
- **PlaneMan:** "Smoke signals revinted for the modern era."
- **pesukarhu:** "A really bad case of screen burn-in!"
- **Mad Malc Is Back:** "Cooking the books in the digital age."

The pick of a great bunch, at least as far as we were concerned was **pesukarhu** with "Another guy burnt by Ashley Madison", but if you think you're funnier than that, head over to the 'Other Stuff' section of our forum (forum.micromart.co.uk) and say something funny (but not too rude) about the picture below – or email us via caption@micromart.co.uk, remembering to add the issue number to the email title. Ta!



Amazon Burns Fire Phone

End of line after 15 months

Amazon has put a stop to its Fire Phone, with all its inventory sold off and no plans to make any more.

The phone wasn't released all that long ago (around 15 months ago), and there have also been media reports of layoffs in the States. The phone failed to ignite passions, truth be told, with a slew of poor reviews and poorer customer uptake leading to an early price cut. Last year, Amazon posted a \$170m writedown, which was chiefly down to the phone, and with reports of layoffs of Fire Phone engineers in Silicon Valley, it looks like this is the end of Fire.



Drone Pilot Faces Prison

Not another one...

What is it with illegal drone flight stories at the moment? They're like buses.

This week's tale comes from Kentucky, where a student at the university has been charged with wanton endangerment because a drone under his control

crashed into the campus sports stadium prior to an American football game. No injuries, thankfully, and the student will have to go to court, where he faces a possible 12 months behind bars. Silly man. This, of course, comes shortly after a drone flight over the US Open earlier in the month.

Snippets!

5G Connections To Reach 240 Million

Think things are fast now? You wait until 5G hits. According to data from Juniper Research, adoption of 5G from 2025 is predicted to be rapid, as active 5G connections are expected to reach 240 million by 2025.

That sounds a lot, but in reality it only accounts for 3% of global mobile connections that will be taking advantage of longer battery life, higher data rates, and reduced latency.

US Court Case Calls Fair Use

A US Appeals court has ruled that copyright holders of videos should consider "fair use" before they ask for users to take them down.

The case revolves around a video of a toddler dancing to a song by Prince, with his record label Universal then asking for the video to be taken down as it wasn't officially authorised. With this decision, it could be tougher for copyright holders to remove videos that they perceive as infringing on any rights.

Remembering Ada

As a nation, we're always coming up with days to celebrate this and events to commemorate that. This one's worth a mention, though. Ada Lovelace Day is on 13th October, aiming to raise the profile of women in science, technology, engineering and maths by encouraging discussions about the women people admire and inspiring others to learn more about Lovelace's work.

Ada Lovelace was, of course, believed to be the first computer programmer, and this is an international day of celebration with events around the UK, including the flagship event in London's Holborn. Follow the chaps behind this on Twitter at @FindingAda.

McAfee For President?

Seriously...

Just when we thought the US presidential candidates couldn't get any stranger than Donald Trump, John McAfee has only gone and thrown his hat into the ring too.

Yes, the former anti-virus boss and all-round magnet of controversial news stories – which tends to happen when you go on the run following your neighbour's murder – has filed for candidacy. His campaign

website is at mcafee16.com, and it features a massive picture of the man himself, alongside a video of him explaining that the forefathers of the United States wouldn't have foreseen a world in which spycams are hidden in cactuses.

Really.

His pitch seems to be broadly based around a current administration that doesn't know how to cope with modern-day troubles such

as cyber warfare and online security issues. The video on his website also features him reading from the Gettysburg Address, which is presumably meant to be powerful. It doesn't really work. Still, how about the opportunity to witness one of his "fireside chats" held over the web, through which you can communicate with him "as if I were sitting in your living room"? Erm...

Minecraft Convention Leaves Adults Angry

"Hey kids, we've got a great idea for the weekend..."

Were you at the Peterborough Arena earlier this month to attend Minevention, the self-styled "best unofficial convention for Minecraft fans"? If you were, we imagine you'd remember all about it because, according to media reports, it was quite the chore for all attending.

The word on the street (and by 'street' we mean press) is that the queues were long. So long, in fact, that disgruntled parents of disgruntled children have demanded refunds for having to wait around for too long to take part in any of the activities. The food was underwhelming too, apparently, as was a lack of stuff to buy. Social media was awash with moans and groans. The BBC quoted one parents as saying that their young lad cried all the way home, which is never a great way to end your day out.

The organisers released a statement saying that it was contacting those who complained individually to address their problems. And on the plus side, those attending set a new Guinness World Record for 'The Most People Dressed As Steve From Minecraft'. Now there's something we never thought we'd write (337 people, in case you were wondering).



Vodafone Rolls Out Wi-fi Calling

No app required

Mobile network provider Vodafone is bringing wi-fi calling to the UK, allowing its customers to make calls over wi-fi networks if there is no phone signal available. So if you're on the London Underground or in a remote location, you might be in luck if there's a wi-fi network around.

This won't require any app either, as it's coming natively to the phone. Whether you're a pay monthly or Vodafone Red consumer, you can take

advantage of this presuming you have a compatible phone. Vodafone will be delighted to be rolling this out, as it marks a possible sweet point for potential consumers worried about sketchy mobile coverage.



Man Shot Holding Phone

In America, obviously

This week's slice of American Pie comes from California, where media reports have focused on a man who was shot by police while holding a mobile phone that was mistaken for a gun.

The man, who was completely unarmed, was shot in the leg and the incident is currently being investigated. As for how all this happened, the man's neighbour was reportedly firing rounds of bullets from a machine gun (!?) and police shot the innocent chap as he reached out, mobile in hand.

Watch videos online of the late, great Bill Hicks for a frank (and parental advisory) assessment of America's gun control laws.

Hello? This Is Your Robot Calling

Robots could become telephone salespeople, report says

The BBC has recently been robot-obsessed in its technology coverage, largely due to a study from Oxford University's Martin School titled 'The Future of Employment: How susceptible are jobs to automation'.

The Beeb's website even asked the question 'Will a robot take your job?', encouraging people to enter their job title to find the answer. The results showed that the most susceptible vocations to a robot takeover in the future are: telephone salesperson, typist, legal secretary, financial accounts manager and "routine inspector and tester".

And the least at risk? Pub landlord. Who knew that robots couldn't pull pints?



Broadband = 10Mb/s Or More

Ovum says Swedes are happiest

Market research firm Ovum has said that the minimum download speed required by most fixed line web users is 10Mbps.

The other two factors crucial to consumer satisfaction were a stable and reliable network that delivers content with a wait time of no more than three seconds, plus outstanding customer service that can resolve most problems at the first point of contact. The most satisfied customers are from Sweden, according to Ovum's research across 30 countries, and the rise of SD and HD video is cited as being responsible for driving the user experience.

The bottom line is that networks need to be able to support high-quality video delivery. Does yours?

Gigabyte P34w V3

A smaller laptop, but one with some surprising specifications

DETAILS

- Price: ~£1,200
- Manufacturer: Gigabyte
- Website: goo.gl/aqtxDi
- Requirements: Windows account, free upgrade to Windows 10



The Gigabyte P-range of laptops have so far impressed us, with the P55k and the P37x scoring highly and making us nod in appreciation of the specification and style.

Now, though, it's the turn of the P34w, a laptop that Gigabyte has somehow managed to cram with an Intel i7-4720HQ at 2.6GHz, 8GB of memory, a 128GB SSD with Windows 8.1, a 1TB secondary hard drive and an Nvidia 970M with 3GB of GDDR5 memory – all this inside a 14" laptop.

Despite its minute proportions, the P34w also features four USB 3.0 ports, HDMI, VGA, gigabit Ethernet, an SD card reader and audio combo jack. There's also a HD camera, wi-fi 802.11 ac/b/g/n and Bluetooth 4.0.

The laptop measures 340 x 239 x 20.9mm and weighs just 1.8kg and has a familiar modern Gigabyte casing design about it, with a mixture of dark grey and flashes of aluminium. The keyboard is backlit and nicely spaced apart to allow for a more fluid typing action. And as with the other P-models available, there's a large touchpad below the keyboard that's tweaked to a decent level of sensitivity without becoming uncontrollable.

There's a fair amount of performance hidden in such a deceptively small case. The 3DMark 11 overall score we attained was 9,216 which, if you can remember, is just shy of the 11,022 of the P37x and a little over the 6,970 of the P55k. Either way you look at it, this is a 14" laptop that can dish out a fair level of gaming at decent frame-rates.

The full HD, wide angle LCD is good, but like the P55k it could really do with being a little brighter for our tastes. However, there's good colour reproduction, and the image displayed is not too far off the kind you'd expect from an IPS monitor.

The battery managed to last around three hours off a full charge, when we used the laptop for a mixture of gaming, video, images and usual office-based tasks. Naturally, if you take the

gaming out of the equation, then the battery will last significantly longer – over four hours in our tests.

This is a very fast 14" laptop, probably one of the fastest we've ever tested in Micro Mart. However, it's also one of the noisiest. When the CPU and GPU get a good workout, those fans certainly kick out a fair bit of noise – up to 48dBA when we measured it a metre away from the laptop. That's equivalent to normal office background noise. While it may not seem like much, if you're using it in a quiet environment, it soon gets noticed.

Thankfully, though, those fans do a good job, and the laptop and the case remain cool throughout the entire day of operation – another plus to Gigabyte considering the specification inside the case and the size of it.

Overall, we were once again impressed with the Gigabyte P-range laptops. The P34w is a fantastic performer with a great specification; it's light, looks good and isn't too badly priced. In short, definitely one to consider for the next laptop purchase.

mm David Hayward

An incredibly fast and small laptop, but a tad noisy



Transcend DrivePro Body 10

Keep an eye on what's going on around you, with this handy personal camera

DETAILS

- Price: £129.99
- Manufacturer: Transcend
- Website: goo.gl/hGxkj7
- Requirements: USB port, Windows 7 or later, Mac OS X, Windows only ToolBox software



We've covered a few of the Transcend DrivePro dash cameras in the past, each surpassing the other in terms of quality and features. However, the company has taken the DrivePro range to a new place with its recently released Body 10 camera.

As you may suspect, the Transcend DrivePro Body 10 is a dash cam for your person. With a tough crocodile clip on the back, you can clip the camera to your top pocket or, if you're a security guard, clip it to your stab vest.

The 160° wide angle F2.8 lens can capture full HD video at 30fps and in low light conditions thanks to the automatic infrared mode. The two buttons on the front of the unit allow for power and taking still images as an added bonus.

First and foremost, the Body 10 is designed for personal safety and evidence collection in mind. It's certainly tough enough for the task, made from an extremely hard wearing and durable plastic, while still remaining reasonably light, weighing just 108g.

It's water resistant for full outdoor protection and has been rigorously tested to military drop test specifications. Even the clip on the reverse

of the body has been tested thoroughly, as well as the rotating 360° arm to which it's fixed to the body of the camera with – all this in a remarkably compact unit that measures 88.4 x 52.2 x 19.6mm.

The battery life is reasonably good, lasting up to three and a half hours of continuous footage off a full charge, with around an hour and half left until it's fully recharged again. Although taking lots of snapshots will eventually limit that time, that's something that'll only be used in the case of recording an incident.

Transcend includes a good sized 32GB micro-SD card with

the DrivePro Body 10, which equates to roughly four hours' worth of recording – more than the battery will last for off a full charge. Hooking it up to a PC is easy enough with the included USB adapter, and you'll also get the DrivePro Body Toolbox with the package that allows you to manage the files stored on the card and alter the settings of the camera to your preferences.

Obviously, the Body 10 is leaning towards the professional market, but that's not to say the average user can't have one about their person. Walking the dog at night, going for a run in the evening or even nipping to



the shops during the day are all times where we've seen someone approached or, worse, attacked. It's not necessarily distilling fear in the population for stepping outside, it's just using technology to help keep us a little safer.

Even if you decide to use the Body 10 as a static camera fixed to a door, it's certainly a useful device. Security professionals will undoubtedly be intrigued, as it's a little more durable than the standard action camera type device.

All in all, a good idea presented in a more than adequate device, with some good features for added measure.

mm David Hayward

Ideal for security professionals or those needing peace of mind



EE Harrier Tab

EE's new Harrier Tab flutters into the Micro Mart offices

DETAILS

- Price: £199.99 or £214.99 PAYG
- £149.99 or £29.99 depending on chosen contract
- Manufacturer: EE
- Website: shop.ee.co.uk/tablets

It seems the norm these days that phone networks have their own devices, since there's an army of Chinese and South Korean companies willing to make branded devices for them to resell.

Having seen this with Vodafone and its Smart 6 range, I was curious to see what EE had baked into its Harrier equivalents.

From the outset, it's obvious that the primary function of the EE Harrier Tab is to sell the customer an EE 4G data contract and possibly sell through some services like those by Amazon.

However, what you get here is a reasonably specified Android tablet running almost the latest version of the OS and mobile data connectivity.

While the external feel of the device is decidedly plastic, the clean lines and curved edged of this widescreen device are generally pleasing on the eye.

At 8.5mm, it's relatively thin, and the 338g weight won't be slowing you down excessively when you run for that train home.

You can get better build quality for this price, but probably not with the 4G LTE connectivity that EE is pushing hard at this time.



Inside, the Harrier Tab is well furnished with contemporary hardware, being built around Qualcomm's recent octa-core Snapdragon 615 processor. When combined with 2GB of RAM and 16GB of storage (10GB free), the Harrier Tab is ready for almost anything the Google Play store can throw at it.

There's also a micro-SD card slot for even greater capacity, should you need it.

The screen is often the first victim of cost control, but the Harrier Tab has one with a native 1080p resolution (1920 x 1080) and a pixel density of 275ppi. The colour range is rather muted, especially in the red channel, but it's better than many budget devices I've encountered.

Critically, the screen exhibits good contrast, so it's generally readable even in less than ideal lighting conditions.

66 You should get a working day out of an overnight charge 99

Performance, as you might reasonably expect with an eight-core CPU, is good, though it's not as rapid as premium devices in some tests. And compared with my old Nexus 10, it's not as fluid playing *Simpson's Tapped Out*, even though the resolution is technically lower.

However, for the majority of Android users, this is a responsive tablet that does most of what you ask it almost instantly.

Another plus point is the Android distribution, an almost vanilla version of Lollipop 5.1.

The only exceptions to this are Amazon Music and the Kindle apps, both of which seemed challenging to entirely remove.

In comparison with some brands I could mention, EE hasn't abused its position by using up the owner's storage before they've even got the device.

Battery life wasn't Apple iPad Mini exceptional, but you should get a working day out of an overnight charge if you don't spend all of that on *Candy Crush*.

If this design does have a technical weakness, it's most

certainly the camera. I'm not sure what went on with the choice of optics and sensor, but the 8MP device doesn't take competent images even in good lighting conditions.

HDR mode does help a little, but I've seen relatively inexpensive phones take far superior pictures.

I should also mention that the wi-fi is 802.11n and not 'ac'; there is Bluetooth but no NFC; and with a suitable SIM, you can connect to both 3G and 4G LTE mobile networks.

“I've seen relatively inexpensive phones take far superior pictures”

On EE, unsurprisingly, you can access its LTE CAT 4 mode and achieve up to 60Mbps if your coverage allows. My local coverage doesn't allow that, and if I was in the market for this device I'd take into account where you'll be using it before signing a long-term mobile contract.

In addition to PAYG options, EE offers four 24-month plans to use with the Harrier Tab. There are two that come with 2GB and another two that come with 10GB, ideally for

those with 4G access. Costs range from £11 to £18, and the more expensive ones reduce the cost of the tablet to just £29.99.

Obviously, you can use the tablet only on wi-fi or use PAYG and avoid a contract altogether.

Compared with the Vodafone Tab Prime 6 that I covered in Micro Mart recently, this is a better device, though it isn't substantially cheaper than equivalent branded tablets.

My problem is that I'm still not convinced many people are willing to pay a monthly contract for a SIM you can't make calls on and an average tablet that you'll mostly use on wi-fi.

The EE Harrier Tab isn't bad by any stretch, but it isn't

exceptional either, in what is a remarkably competitive market at this time.

mm Mark Pickavance

A branded mobile network connectable 8" Android Lollipop tablet



Gameband + Minecraft

The young gamer's ultimate wearable?

DETAILS

- Price: £64.99
- Manufacturer: Gameband
- Website: goo.gl/KoGMsU
- Requirements: USB port (3.0 for best results), Windows, Mac and Linux compatible



The success of *Minecraft* isn't just centred on the gaming world any more. Indeed, this huge phenomenon has spread to film, TV, music and even hardware.

Most of the success of the new generation of virtual reality is said to come from those wanting a new perspective on their *Minecraft* world, with Notch himself donating a hefty sum to the Oculus Rift when it was first announced.

Now Computing LLC and Gameband have released an interesting addition to the *Minecraft* fandom collective. The Gameband is basically a USB 3.0 bracelet with 8GB of space on which you can store your custom created *Minecraft* worlds and even the full game, to be accessed on another computer.

It's an interesting concept, but the Gameband goes beyond being just an average USB storage device. Installed on the drive you'll find the Gameband application, which when executed will personalise the Gameband setup to your email account. This will then enable you to back up your existing *Minecraft* setup, worlds and add-ons, with the aim of allowing you to copy them to a new computer or, as we said, play them directly from the USB part of the Gameband itself.

In addition to backing up your own worlds, the Gameband comes with a few pre-loaded maps. These include examples from SethBling, Dragoz and Hypixel.

Furthermore, the Gameband houses an 140 array red LED display along the top of the band, where, using the accompanied app PixelFurnace, you can display the current time or hack the LED to display whatever information you want.

The LED will illuminate at the press of a button, and with a decent 11mAh rechargeable battery in place, you'll be able to get roughly 20-odd days of use before you'll need to plug

it back into an active USB *Minecraft* port again.

The band itself is surprisingly well constructed. The clasp protecting the USB section is made of stainless steel and features a graphic of a *Minecraft* Redstone block. Opening it requires a fair amount of pull, so there's not much chance of the band loosening and falling off when you least expect it.

The rest of the band is made from a tough, black plastic, Thermoplastic polyurethane, to be exact, similar to that of one of the higher-end semi-smart watches that are currently available. It's certainly

durable enough and has been well designed, taking into consideration the fact that the majority of sales will be to young people and children, where knocks and bangs are a regular occurrence. But it's also very comfortable, feeling more like a rubberised strap as opposed to something all plastic or a standard watch strap.

The Gameband + Minecraft currently ships in two different versions, a Gameband Diamond and a Gameband Redstone. The Diamond version displays green LED text and *Minecraft* diamond as the clasp graphic, whereas the version we had to test has red LEDs and the Redstone clasp. Both cost £64.99.

Having *Minecraft* wherever you go is always going to be a niche product to sell, even with those who play it regularly. However, the Gameband is actually quite a good device. It's well built, well presented and would make an ideal gift for the younger *Minecraft* enthusiast in the family, plus it's not too expensive for a potential Christmas or birthday present.

mm David Hayward

An ideal present for *Minecraft* fans



Gigabyte P55k

A 15" laptop with a surprising amount of power

DETAILS

- Price: ~£1050
- Manufacturer: Gigabyte
- Website: goo.gl/YGMfkS
- Requirements: Windows account



We recently reviewed the Gigabyte P37X, an impressive gaming laptop that could hold its own against a powerful gaming desktop and, needless to say, we liked it very much. This time, though, we have a slightly different offering from Gigabyte – a smaller laptop but one that can still pack a decent punch.

The Gigabyte P55k Version 4 has an impressive spec list. An Intel i7-5700HQ at 2.7GHz, 8GB of memory, and Nvidia GTX965M with 2GB of GDDR5 memory make this a machine capable of playing virtually any modern triple-A title.

The 128GB SSD comes with Windows 8.1 pre-installed, with the option to upgrade to Windows 10, and Gigabyte has even shoehorned in an extra 1TB 7,200rpm secondary hard drive for good measure.

Connectivity is good too, with four USB 3.0 ports, HDMI, VGA, gigabit Ethernet, Bluetooth 4.0, 802.11 ac wi-fi, an SD card reader, HD web cam and multi DVD-RW optical drive. Suffice it to say, it's a perfectly capable system even if gaming isn't your cup of tea.

The P55k measures 380 x 269 x 34mm, making it a rather compact 15" laptop; it's quite light too at just 2.4kg. There's

a good 1920 x 1080 full HD LCD screen fitted, with a decent viewing angle. It's clear and reasonably sharp, but for our personal tastes it could probably do with being a little brighter.

It's a well presented laptop, and there's a good mix of sleek contours and sharpened edges that give it an almost performance sports car feel. Its coloured matte black throughout, with a silver Gigabyte name badge on the lid and splashes of orange along the inner trim and screen hinges. The backlit keyboard we liked very much, as it spans the entire width of the laptop base, feels good to use and features a separate number pad.

Below the keyboard you'll find a large trackpad, which is pitched just right in our opinion. We've come across many trackpads over recent months that are way too sensitive, but Gigabyte has managed to find the Goldilocks version of the trackpad on the P55k.

The performance is pretty good for a 15" laptop. The overall 3DMark 11 score came to 6,970, which is enough for most average gamers. However, the more dedicated laptop gamer will probably opt for the previously mentioned Gigabyte P37X; that gave us a 3DMark score of 11,022.

Benchmarks only tell one part of the story, though, and in our testing of the P55k we found it very responsive, capable of playing a wealth of games on high settings (although not ultra) and perfect for other duties. Image and video editing were responsive, as were countless other productivity duties.

The Gigabyte P55k costs in the region of £1,050 for the model we reviewed. There are other specifications available with less memory, Blu-ray drive or a different set of drives installed, all of which are priced accordingly.

It's not often you get a reasonably priced and well

specified 15" laptop of this build quality. It's quiet, keeps cool when under stress, and the battery gave us around 2.5 hours' worth of play before it needed to be recharged. It could be better, but that's as long as most commutes or the length of time most of us will be away from a plug socket.

Certainly one to consider for your next laptop purchase.

mm David Hayward

A good all-rounder, with decent gaming capabilities



Corsair STRAFE Mechanical Gaming Keyboard

With a product called 'Strafe', there's always a chance things could go sideways

DETAILS

- Price: £100.98 (Corsair)
- Manufacturer: Corsair
- Website: www.corsair.com/
- Requirements: Two USB ports,

Gaming keyboards are always something of a compromise, because typists don't repeatedly bash the same limited selection of keys or want complex macros that initiate rhythmical lighting effects.

But as I was ably reminded by Corsair's new Strafe, few gamers exclusively user their platform to play games, and having a keyboard that does play and work well is highly desirable.

Corsair has made some very slick gaming orientated keyboards in the past couple of years, but more than £150 for ones where you can select the RGB of each and every key are somewhat niche.

Thankfully, the Strafe is a bit cheaper, but still more than £100 and, for this writer, singularly more practical. My first impressions were also coloured by the Cherry MX switches (Red or Brown) that it comes with, which made it easy to use the Strafe to type this review. The review model I requested used Brown MX switches, and it's a very positive action, if a little noisy for an office.

What also helped is that Corsair didn't go with any crazy layout; this is a normal



66 Possibly the subtlest aspect in here is the backlighting 99

sized keyboard, and the keys are where I'd normally expect to find them.

That begs the obvious question of what's in here for the gamer.

The answer to that depends largely on what types of games they play and how much glitz they like on their system. But beyond that it is also a sturdy piece of input furniture that could grace just about any system that's used in anger.

Possibly the subtlest aspect in here is the backlighting, in a single red colour but controllable on a per key basis.

If you want another colour, Corsair still makes the K70 RGB, because the Strafe is exclusively red.

Using Corsair's own downloadable Corsair Utility Engine (CUE), it's possible not only to attach macros to every key, but you can also illuminate just specific keys, like those that are specifically used by the game you're playing.

That's stylish looking and, if you play in relatively low light, rather useful.

All programmability (and I've only touched on what you can do), is stored in the keyboard's

own internal memory. Therefore, those settings stay if the keyboard is disconnected or even moved to another PC.

As another user definable enhancement, Corsair also provides a puller and a selection of special textured keycaps to replace the default ones. They include ten keys, QWERASDF, with two each of W and D. The tops of the keys, in addition to being textured, are also slightly angled, to help you locate them in the heat of battle.

As you might reasonably expect for this sort of cash, Corsair gave the Strafe N-key rollover on up to 104 keys and 100% anti-ghosting. The report rate is also alterable, with selectable timings for 8ms, 4ms, 2ms, 1ms and BIOS mode.

Everything up to this point I liked, but there were a couple



“ Corsair used cable on this keyboard of the very highest quality ”

of aspects to this design that I was less thrilled about. The two that really stuck out were the USB connecting cables and the USB pass-through.

Corsair used cable on this keyboard of the very highest quality, though it's also very

thick and not inclined to easily forget the bends it acquired inside the box. A cable that more easily relaxed would be an improvement over the one it used.

Part of the reason that the cable is like this is the

Key Features

- USB pass-through port.Fu
- Fully programmable.
- Gaming grade circuitry 100% anti-ghosting.
- Dimensions LxWxH 448x170x40mm.

backlighting and pass-through USB, which require two USB ports to be connected, not just one.

What confused me was if you'd gone that far, surely you'd use a USB hub and provide two USB ports, one each for mouse and gaming headset? Oddly, Corsair launched the new VOID headset alongside the Strafe, as if to underline my point.

Those relatively minor problems aside, the Strafe is a top notch keyboard design that is a joy to use for both gaming and less entertaining endeavours.

I've seen people whine that Corsair didn't include any extra function or dedicated media control keys, but frankly I can never remember to use them.

The Strafe is all about providing something that most people can use the day that they buy it and not need to go through a muscle memory retraining programme.

In this respect, I much prefer it to Corsair's more exotic

offerings, unfettered as it is by their lighting excesses and steep prices.

I just wish it was a little cheaper perhaps, because below the physiological £100 mark I'm sure plenty more people would experience it.

If you want a decent gaming keyboard that won't ruin your typing, then the Strafe is most certainly the right option.

mm Mark Pickavance

A great gaming keyboard with excellent mechanical switches



GROUP TEST

Graphics Tablets

Graphics tablets have evolved over the years to incorporate a number of features inherent to the current operating systems. They have handwriting recognition elements, finer detail than ever before and some even display a HD screen.

David Hayward has six different models on test, to see which will enhance his minimal artistic talent.

Graphics Tablets

Wacom Bamboo Pad

DETAILS

- Price: £41.81
- Manufacturer: Wacom
- Website: goo.gl/ZkUYvj
- Requirements: USB port, Windows 7 or later, Mac OS X 10.7



▲ The Wacom Bamboo Pad is very stylish indeed

Wacom is often regarded as the kings of the graphics tablet. The company's range is quite extensive, and as a result it's one of the most prolific pushers of new graphics tablet technologies.

The Wacom Bamboo Pad is something of a different direction for the company. Rather than the more traditional look and feel of a graphics tablet, Wacom has employed some nifty designs with splashes of colour and an almost Apple-like appeal.

The Wacom Bamboo Pad comes in four different colour schemes: purple, green, blue and black. The colours are used on the trim surrounding the pad, the rear, the action button and the top of the pen. In the case of the black version, the actual pad is grey while the trim is black.

This is admittedly a rather stunning looking graphics tablet. The slightly angled top of the pad features the Bamboo logo, with a section to the side to store the pen/stylus when not in use and a battery cover section – it requires two AAA batteries. The actual pad itself, excluding the black version, is a stark white, where you can move the pen along or use as a multi-touch pad for touch capable operating systems, such as Windows 8.1.

Featuring the Wacom Feel IT Technology, the pad is extremely sensitive, but not in an uncontrollable way. It connects to your PC or Mac via a small USB 2.4GHz wireless dongle, so there are no trailing cables, and once the software is installed it's extremely easy to use as an extra control peripheral.

The pen is roughly the same size as a common Biro and wireless. It flows well across the surface of the tablet and is responsive enough for fairly detailed work. It's comfortable enough, and with the 1,024 pressure levels, there's a good range of response.

It measures 141 x 166 x 4.5 to 15.7mm (to the raised section at the top of the tablet). For the most part it's enough space to work on – if you're concentrating on minute alterations to an image, for example. However, we did find it a little too small for larger image work or at times when we were using it as a touch pad for scrolling through a Windows 8.1 desktop. Naturally, in such circumstances you'd revert to a mouse, using the tablet for the graphics editor function. Either way, you'd find an alternative method.

It's also very light, weighing just 150g, so it's ideal for use as a mobile graphics tablet, as opposed to a stationary desktop model. The

combination of the wireless, battery life of over a month and diminutive form all speak of a peripheral designed for those on the go or at least those who have to work in a confined space with their laptop.

In this situation, it works extremely well. We can see it being a part of a mobile designer's package, as opposed to being on the desk of an engineering office. However, it'll work either way.

The Wacom Bamboo Pad is certainly a good graphics tablet, although to be fair, it's sold as an external touchpad rather than a graphics tablet. But it does fall in the sales category as a graphics tablet, hence its inclusion in the group.

On the whole, if you do some light design work on the go, the Bamboo Pad will look good and work well enough. For more serious work, you'll need a proper graphics tablet.



Trust Ebrush Widescreen Tablet

DETAILS

- Price: £40.49
- Manufacturer: Trust
- Website: goo.gl/qvbteR
- Requirements: USB port, Windows 7 or later

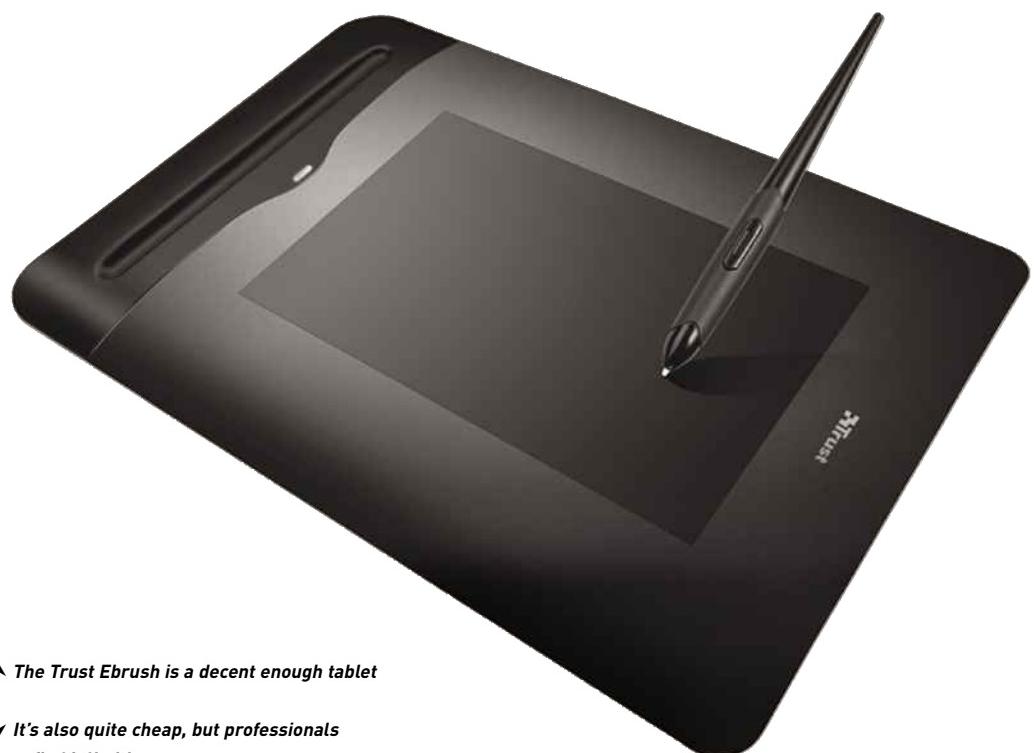
Moving on, we have a more specific graphics tablet in the form of the Trust Ebrush. This is one of two graphics tablet products available from the company (we'll be reviewing the other model later in the group) and the one that's more designed for a static desktop and a higher level of precision.

The Trust Ebrush Widescreen is a nicely designed peripheral. The black and grey colouring throughout, including the pen, certainly looks professional enough without being too trendy, and it's a robust and well-built tablet.

It measures 14 x 347 x 236mm and weighs a solid 857g. It has a good sized working area of 204 x 127mm, 2,048 pressure levels and the ability to map across a multi-screen setup. Along with the graphical functions, it also supports multi-touch and the various gestures associated with the likes of touch capable operating systems.

The pen is a little heavy, as that's where its battery is stored, but it feels good in the hand and flows very well across the working surface of the tablet. It's a little too sensitive for our liking, but you can tweak the settings of the pen and the pad through the accompanying software to better suit your needs.

The software that comes with the Trust Ebrush also contains the freeware painting tool Artweaver. It's no Photoshop, but it's certainly a good package



▲ The Trust Ebrush is a decent enough tablet

▼ It's also quite cheap, but professionals may find it limiting



to bundle with the product. But even without installing Artweaver you'll be able to use various built-in tools or other products to use the pen and tablet for handwriting, brush and other touch-up tasks to a pretty high degree of accuracy.

The Trust Ebrush is connected to the PC via a USB cable (which we thought could do with being a little longer), and you also get two additional pen tips with a

pen tip removal tool and user's guide. All in all, there's enough to get you up and running.

We found the Trust Ebrush to be quite useful. After we adjusted the sensitivity a little, the functions of the tablet were certainly good enough for our limited skills with the digital brush. Using a combination of the included Artweaver software and the Ebrush tablet, we could get a good level of detail when

editing the images we used – just a grouping of stock HD wallpaper images – and the various gestures worked well without too many signs of lag.

Overall, we thought the Trust Ebrush was a good graphics tablet. It may not be quite up to the professional standard that a CAD user or designer would appreciate, but for some amateur work it does the job well enough. It's also a good price, at just £40 or thereabouts depending on where you shop.



Graphics Tablets

Trust Flex Design Tablet

DETAILS

- Price: £18
- Manufacturer: Trust
- Website: goo.gl/OQ43Ea
- Requirements: USB port, Windows 7 or later

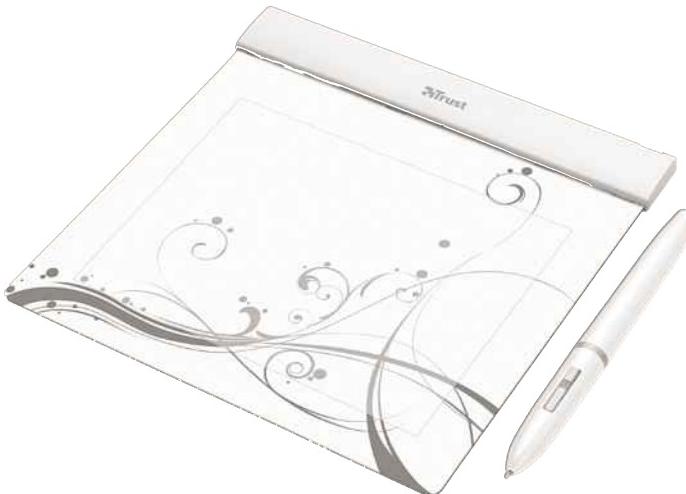
As we mentioned in the Trust Ebrush graphics tablet review, this is the second graphics tablet from the company, and it's radically different from the other Trust model in many ways.

The Trust Flex Design Tablet is, as you've no doubt already guessed, a flexible almost mousepad-like surface, with a solid plastic top where you'll find the USB port to connect to your PC.

It measures 7.4 x 190 x 195mm and weighs around 190g, so naturally it's a very portable graphics tablet. You get a 155 x 120mm working space on the pad itself, with the rear of the pad having a non-slip surface for work on any surface. Again, there's the feeling that this is more of a posh mousepad rather than a true graphics tablet, but it does a decent enough job despite its limitations.

The accompanying pen is quite large in the hand, and with the battery (also included, a single AAA) is a tad heavier than a normal Biro, for example. But it can detect up to 2,048 levels of pressure, using the variation in levels to automatically change the size, colour or various settings depending on what you're doing with it.

The design of the tablet is okay. There's a grey pattern across the surface of the pad, with a light square drawn over the working area. It's



▲ The Trust Flex Design is more like a posh mousepad



▲ It works well enough, but it's very small

package, along with the drivers, guide and so on. There are a couple of spare pen tips and the tip removal tool too and an exceptionally small USB cable – less than half a metre.

Using the tablet isn't too bad, but it is very small. The working area does at times feel very cramped, and you'll be concentrating on drawing, only to find you've run out of the working area into a dead zone. But within the working area it does respond well, and you can get a decent level of accuracy.

That said, the professional designer will most certainly find this graphics tablet very limiting and probably not as accurate as they'd require for their job. As it's more of a touchpad look and feel, it'll work well within Windows 8.1 and for some low-level image editing and gesture and handwriting recognition tasks.

The Trust Flex Design Tablet will probably work well with the amateur editor or those who require access to point and handwriting features without the use of a mouse – as in a shop for signing, for example. And considering it only costs around £18, you can happily get away with using it without worrying about it breaking the bank.

“ It has a good level of sensitivity and can be quite accurate ”

fairly nondescript, with the exception of the pattern and the Trust logo on the plastic bar at the top of the tablet.

It has a good level of sensitivity and can be quite

accurate and, as with the other Trust tablet, the settings can be altered to suit your needs. Also as with the Trust Ebrush you get a copy of Artweaver included in the



Wacom Cintiq 13HD Graphics Tablet

DETAILS

- Price: £700
- Manufacturer: Wacom
- Website: goo.gl/dfYye4
- Requirements: USB, HDMI, Windows 7 or later, Mac OS X 10.6 or later

Moving up the scale now, we have another product from Wacom, but this time it's a little more technical than what we've already looked at.

The Wacom Cintiq comes in two distinct versions, the 13HD, which we're looking here, and the 13HD Touch, the obvious difference being the two is the touch display rather than the standard active pen.

The Wacom 13HD certainly isn't lacking in specifications. It measures 375 x 248 x 14mm and weighs 1.2kg, with an active area measuring 299 x 171mm. The star of the show, in terms of the specifications, is the large 13.3" a-Si Active Matrix TFT LCD screen, capable of full HD 1920 x 1080 resolution.

The Pro Pen has a 2,048 pressure level sensitivity rating, as well as tilt recognition. It's lightweight and feels good in the hand, and it flows across the screen very smoothly and without any noticeable lag.

The Cintiq connects to your PC or Mac via a kind of three-in-one cable that covers power, USB and HDMI, all in one single 2m cable that's surprisingly thin considering the amount of data and other things it must be shifting.

The screen itself is coated in a matte finish, which doesn't reflect environmental lighting and is ideal for use when lying flat on the surface of a desktop. It's amazingly clear, sharp and



▲ The Wacom Cintiq 13HD is a splendid looking graphics tablet



▲ But £700 is a little steep for most people

very bright, with some very good viewing angles. It comes with a stand to hold it upright at varying angles, with each angle being easy to work from.

With such a good screen in its specifications, the Cintiq 13HD is great for detailed work, be that professional design, CAD and so on or even digital artwork. To the left-hand side of the screen you'll find a set

of four controls, along with a kind of D-Pad rocker ring and a home button. These can be customised to any application, offering the user a more productive way of getting to the settings they need without having to resort back to the standard keyboard and mouse on the system.

The entire package is superbly presented and professional



looking. There's a great level of detail available, and the actual tablet itself is both sturdy and sensitive enough for the finer degrees of control needed by a design specialist.

The only gripe we have with it is the cost. Naturally, you'd expect something of this quality to cost a pretty penny or two, but in this case you're looking at around £700. Clearly this is something only the committed designer will probably go for, as opposed to the almost amateurish looking entries elsewhere in the group. Still, it's pretty amazing.

If you're looking for a simple solution for a graphics tablet, this isn't going to be the one for you. If you're a pro, then you'll probably already have one of these sitting on your desk. For the rest of us, if you get the chance to test one out, we highly recommend having a play with it.

Graphics Tablets

Genius PenSketch M912A

DETAILS

- Price: £120
- Manufacturer: Genius
- Website: goo.gl/YjMCcJ
- Requirements: USB port, Windows 7 or later, Mac OS X 10.4 or later



▲ The Genius PenSketch M912A is an excellent tablet

Genius is quite a well-known company in PC circles. The mice, keyboards, headsets and other peripherals the company produces are some of the most common place on the shelves of both physical shops and virtual ones.

We didn't realise, though, that the company also made a graphics tablet, the PenSketch M912A. This is a surprisingly capable device, with a long list of features, specifications and added extras, which is quite surprising considering Genius is often credited with producing some of the cheaper peripherals we see today.

It measures 447 x 388 x 66mm and weighs a sturdy 725g, with a working area measuring 228 x 304mm. The PenSketch comes in a large box that contains not only the tablet itself, but also the pen, two pen tips and a removal tool, a wireless optical mouse, an ink-pot looking stand for the pen to sit in, a copy of Adobe Photoshop Elements 9 and a copy of Corel Painter 4 Essentials.

The tablet itself is pretty basic looking but functional. The bottom of the tablet is rounded and shaped for comfort when holding, although you probably won't be holding it for too long. The base is matte black, as are the trim and surrounding plastic, with four rubberised feet for



▲ There's loads of software available, and it's ideal for both amateur and professional users

non-slip on a desktop. The actual work area has a kind of tracing paper layer fitted to it, which has a double use in that it protects the surface below and you can place images under it to trace over.

With 2,048 pressure levels of sensitivity, the wireless pen can be configured to a range of settings to suit the user. By

default it's sensitive enough to not be too fly-away but also not quite as sensitive as we've become accustomed to. Obviously, you can alter the sensitivity through the driver and software.

In use, the PenSketch M912A performed very well. The pen moved across the work surface easily, and it

was a refreshing change to have such a large area to work on. At the top of the tablet, you'll find eight buttons, four either side of the power LED. These can be configured but are by default: eraser, undo, layer, flip 3D, brush size adjustment buttons and a pair of zoom buttons.

The surrounding bezel is quite large but acts as a palm rest for long use of the tablet and, as we mentioned earlier, the pen stand has a rubber pot into which you can put the pen when it's not in use to protect it.

Although the Genius PenSketch M912A may not have an LCD screen to its name, it is by far the best graphics tablet we've tested so far. It's easy to use, comes with excellent software and hardware, performs extremely well and is well presented. And it only costs in the region of £120.

All in all, a great graphics tablet for both professional and amateur designers and artists.



Adesso CyberTablet Z12

DETAILS

- Price: £106
- Manufacturer: Adesso
- Website: goo.gl/kKMmQS
- Requirements: USB port, Windows 7 or later, Mac OS X 10.4 or later

Adesso is a company that spans a range of products, from mice to keyboards, headphones, speakers, webcams and, of course, graphics tablets.

The company has a range of three current models – the CyberTablet Z12, the CyberTablet Z8 and the CyberTablet M14 – all of which have slightly different specifications. The Z12, however, is the entry-level tablet in the range.

The CyberTablet Z12 measures 304 x 254 x 8.9mm and weighs around 400g, with a working area measuring 254 x 158mm. In some regards it's very similar in appearance to the Trust Flex, but without the flex part. You have the main tablet surface in grey with the same kind of translucent tracing-paper-like material that we saw on the Genius model, protecting the surface and for use when tracing an image. And there's a wedge of plastic along the top where the USB port is housed.

The pen is a very stylish, Parker Pen-like affair, which comfortable to use and very light, as well as offering 1,024 levels of sensitivity. While that may not be as much as some of the other examples in the group, the pen is quite precise in its operation.

Using the CyberTablet Z12 is very easy; you can plug it in and start using it straight away under Windows 7 and 8.1, but



you won't have access to the row of 12 quick buttons along the top of the working area.

It's a smooth and quite detailed set to use. There's a higher degree of control in the likes of the Genius model, but for the sake of touching up an image, the CyberTablet is more than capable. The quick launch buttons along the top include new document, undo, cut, paste, copy, save, next and back, screenshot, zoom, home and an email launch. You'll need to

configure some of them for your own preferences, but on the whole they work well.

The package also comes with ArcSoft Photo Studio and ArtRage 2.6, both of which are perfectly capable software packages, but you may need to pay out for something a little more powerful if you're planning on using this in a more professional manner.

Overall, the Adesso CyberTablet isn't a bad graphics tablet. It's more than enough for

▲ The Adesso CyberTablet Z12 isn't too bad

◀ But the Genius PenSketch is better overall

most amateur users or beginners at least. However, professionals or semi-professionals might find it a little limiting and opt for something more along the lines of the Genius or the product line from Wacom.

It costs around £106 – from Amazon in this case – but in our opinion you're better off spending a little more and opting for the Genius PenSketch.



EDITOR'S CHOICE

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Genius PenSketch M912A

The Genius PenSketch M912A was, in our opinion, the better of the graphics tablets we had on test.

Although it wasn't as exclusive as the Wacom Cintiq, it didn't cost anywhere near as much and came with a grand selection of software and accessories. Overall, it was an excellent graphics tablet for users of any creative level.

HIGHLY COMMENDED

**micro
mart**



Wacom Cintiq 13HD Graphics Tablet

Okay, it costs £700, but the Wacom Cintiq 13HD is a really splendid graphics tablet.

As we said, if you can afford one, then you'll be very happy, and if you can't then see if you can get hold of one to play around with.

How We Tested

Each graphics tablet was hooked up to a Windows 8.1 and Windows 10 PC. We used a combination of Paint.NET, Adobe Photoshop Elements 9, built-in Windows gesture and handwriting recognition and whatever software came with the graphics tablets themselves.

	Wacom Bamboo Pad	Trust Ebrush Tablet	Trust Flex Design Tablet	Wacom Cintiq 13HD	Genius PenSketch M912A	Adesso CyberTablet Z12
Price	£42	£40	£18	£700	£120	£106
Overall Dimensions	141 x 166 x 4.5mm	236 x 347 x 14mm	190 x 195 x 7.4mm	248 x 375 x 14mm	388 x 447 x 66mm	254 x 304 x 8.9mm
Working Area Dimensions	135 x 145mm	204 x 127mm	155 x 120mm	299 x 171mm	304 x 228mm	254 x 158mm
Weight	150g	857g	190g	1.2kg	725g	400g
No Of Pressure Levels	1024	2048	2048	2048	2048	1024

Your Letters

Windows 10 Experience

As a regular reader of Micro Mart and someone who has had useful advice from you in the past, I thought that you might be interested in my experiences with Windows 10.

I only use Windows systems, as this is what I have been using for the past years in my workplace. I started with Windows 3 and have moved through the various iterations of Windows. Currently, I have a laptop running Windows 7, another running Windows 8.1 and finally one running (now) Windows 10.

The Windows 10 laptop I upgraded round about 9th August from Windows 7 Home Premium. The upgrade to Windows 10 ran much as expected, and I ended up with a Windows 10 activated system. This worked much as I expected. I use Office 10, Edge (I used IE11), Chrome,

Photoshop and other software – nothing very stressing on the system. After about a week of successful use, I decided that I should install an SSD into the laptop. I cloned the current system to the SSD and then installed it into the laptop. The system booted and ran okay. The problems started when I came to make changes. I kept getting a "The change cannot be made until Windows is activated" message; having used Belarc to get the new product key I used this to activate Windows 10. No luck. I got the message "This is not a valid product key" and was referred to the Apps Store to buy a new key for £100. Thinking that I had messed up the clone, I retried various rebuilds but ended up at the same non-activated state.

To cut a long story short, I reinstalled Windows 7 to the new SSD and did the Windows 10 upgrade. This worked

perfectly, and all my software ran as I expected. I then carried out the recovery clean-up so that I could only put back the programs I wanted. The original disk was very cluttered with test programs, etc. After the clean-up, everything is still working.

The moral of the story is that don't do the upgrade if you have changes in mind. Do the changes first before upgrading to Windows 10. I think, and I cannot prove it, that on booting Windows 10 there is a check made to Microsoft to ensure that the system is legal. By changing the disk, I broke the 'for life rule' as a hardware change was made. The upgrade is only free if nothing changes.

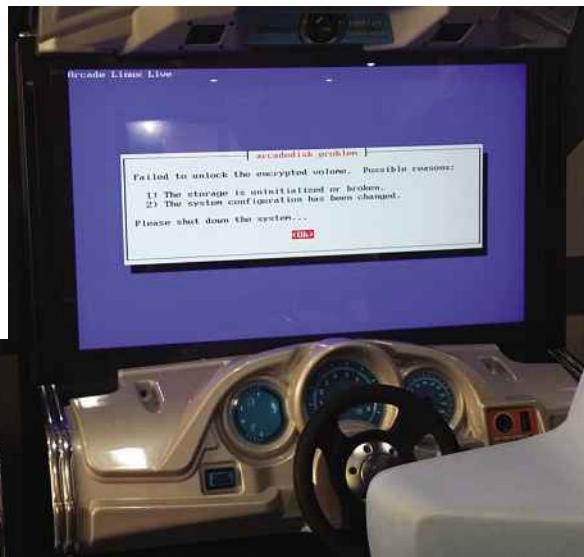
I hope that this might help other readers.

Frank Metcalf

Linux Crashing!

Don't know if you're still doing the pictures of Windows crashes in the real world. But while walking around a local arcade with my granddaughter I came across a game that crashed. At first I thought it was an old DOS system, but on closer inspection noticed it wasn't.

Tetsuo Kin



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Mighty No. 9

Best Indie Games of 2015 So Far (And What's Coming Next)

James looks at some of the leading lights of the burgeoning alternative gaming scene for the PC

The PC is one of the most diverse and exciting gaming platforms around, so it can be frustrating, as a gamer and developer, to see attention lavished on MMOs and console ports that make the PC out as either an inaccessible platform for hardcore gaming, or the console scene's irritating kid brother.

There's little doubt that, at its best, the PC trounces high-end console hardware – but most of us don't have the hardware to compete with that. However, if you find yourself turned off by AAA games that demand access to increasingly high-end components to deliver what is, essentially, the same experience you've had a thousand

times before, don't worry. You're not alone. Big-budget gaming has its place on the PC, but it doesn't necessarily have its place on every PC.

The indie games scene is strong; you only have to look at the global industry that *Minecraft* has become to see that the financial opportunities for developers are boundless, but so are the artistic ones. Unfortunately, without large marketing budgets and promotional machines, it's tough for indie games to find an audience, so we've compiled a list of gaming gems covering 2015's best indie and low-profile titles so far, and we're pretty sure there's something here you'll want to look for further down the line.

▲ *Hotline Miami 2: Wrong Number*▲ *Spirits of Xanadu*

Indie Games of 2015 (So Far)

2015 has already proven itself a banner year for indie gaming, with some hot sequels arriving and a huge number of new titles making their presence felt. Here are our favourites, and where to find them.

Hotline Miami 2: Wrong Number

www.devolverdigital.com

The sequel to the indie smash hit *Hotline Miami*, *Hotline Miami 2* expands the story of the pulse-pounding top-down beat/shoot/

murder 'em up while retaining the trance-like experience that made it so unique. Jumping throughout the timeline – it's set before, during and after the original game – this sequel focuses on several characters affected by the killing spree of Jacket, the character from the first game.

One plot thread focuses on an impending nuclear war, while another covers the wave of vigilante and copycat murderers inspired by the events of the original game. The psychedelic ending to its story split gamers down the middle, but it's impossible to deny that only the indie gaming machine could've produced something so compelling and original.

If you've played the first game you'll be familiar with the mechanics – a combination of stealth and quick-fire action that'll leave your adrenaline rushing and your brain swearing at the guy you just can't seem to beat to the draw. New features introduced for this sequel include a hard-mode where enemies are more difficult to kill, and new abilities like dual-wielding, roll evasion, one-punch kills and the ability to control two players at once on a single mouse. It's gory, intense, great fun, and available on Windows and Mac machines for £12.

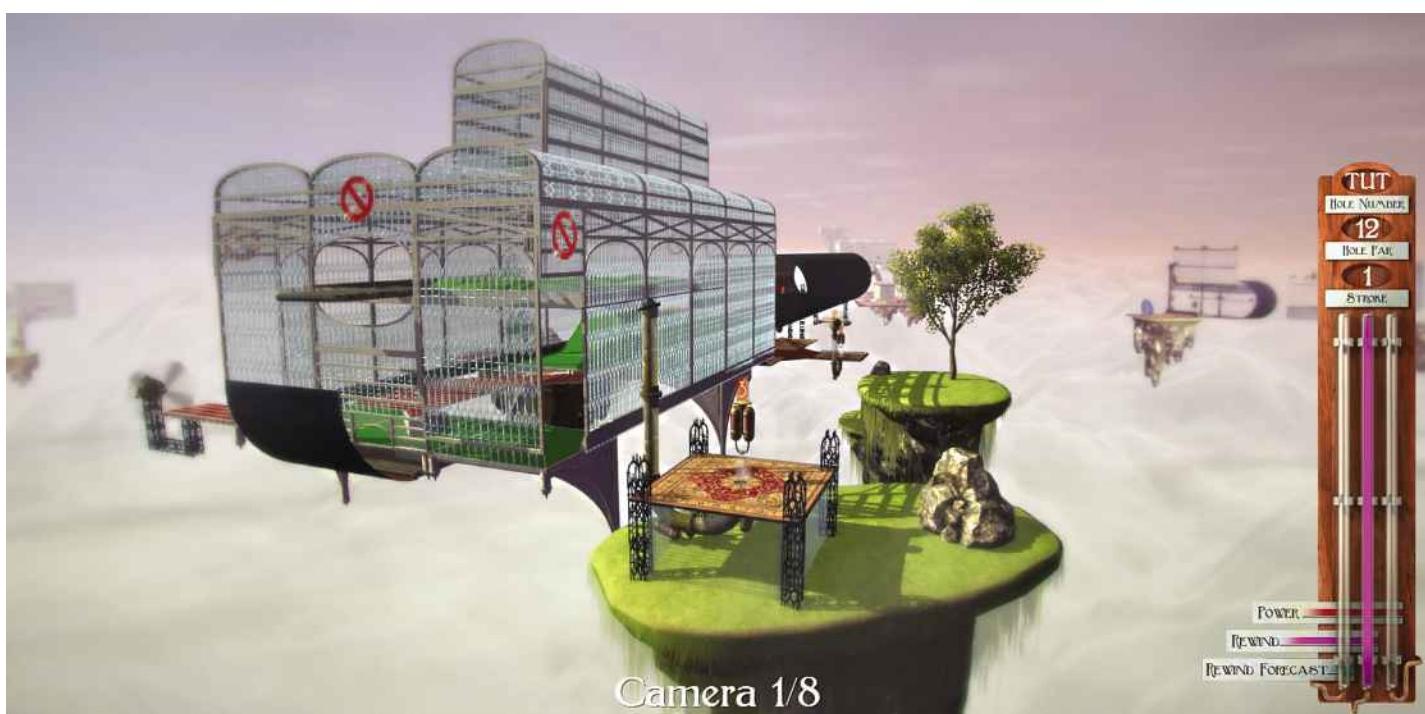
Spirits Of Xanadu

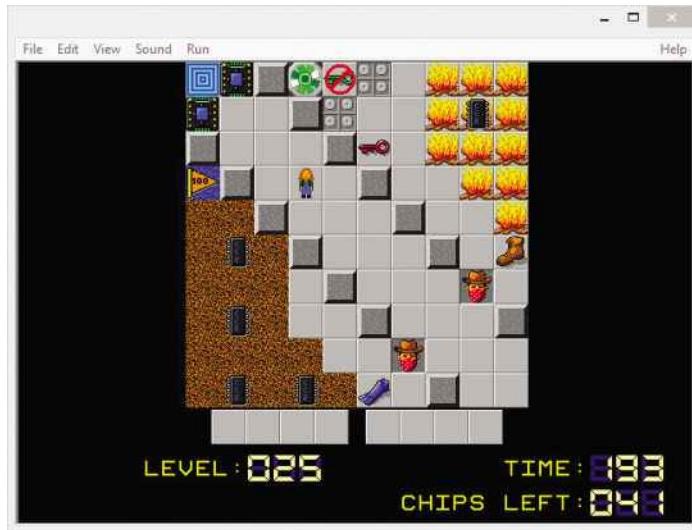
www.spiritsofxanadu.com

If you're a fan of narrative-drive first-person games that are more about atmosphere than action (think *System Shock* meets *Gone Home*) then you'll probably appreciate *Spirits Of Xanadu*. Set in an alternate 1980s, its minimalist 3D graphics give it a stark, stylised appearance that somehow creates an experience even more alien and unsettling than the most detailed visuals could ever hope to.

Although its visuals seem simple, the game itself defies that impression. Environments are highly interactive with puzzles and FPS elements combining beneath a plot inspired by classic sci-fi. Arriving on a deserted spaceship orbiting a distant planet, you explore the derelict craft with only your imagination – and a legion of deactivated robots – for company.

Like all good space horror, *Spirits Of Xanadu* plays on existential fears and uses your own paranoia as a weapon. The puzzles can be tough, and while the game isn't interested in holding your hand (it's

▲ *Vertiginous Golf*



▲ *Chip's Challenge 2*



▲ *Gravity Ghost*

played as an immersive experience, where you find the clues yourself) there are plenty of walkthroughs and videos that'll help you past the most difficult sections – and it's worth it to play the game's story through to its conclusion. It's available for Windows, Mac and Linux and will set you back £11.

Vertiginous Golf

vertigo-golf.com

It's fair to say that a lot of the best indie games have a certain pretentiousness to them – if you wanted to criticise (and some do) then you might say they care more about being artistic than fun. This is not a charge anyone will level against *Vertiginous Golf*. A steampunk-inspired mini-golf adventure game. It is exactly what it sounds like.

Set on a series of floating islands high up in the sky, the game is set in a retro-future world where the cloud city of New Lun-Donne floats above the polluted and dystopian Scudborough; the only joy in the latter being to hook up to a VR unit and playing a round of fiendishly difficult virtual golf.

As the genre goes, it's both crazy and crazily difficult. Some rounds are standard stroke play, while others demand that you play fast, or through a larger arena, or go for distance. While the plot and game exist independently of one another, the former provides a reason to power through the latter, despite its difficulty..

Not everyone is going to find it a lot of fun, but if you're after a golf game that's both expertly crafted and completely different from any other, there's no better choice than this. You can get it for £15, either for Windows or Mac.

Chip's Challenge 2

store.steampowered.com/app/348300

We imagine many of Micro Mart's readers will, at some point, have encountered the original *Chip's Challenge*, whether on Windows or some other platform. If you haven't, it's a tile-based puzzler with block-pushing elements and almost 150 levels that stole months from people during its initial release. *Chip's Challenge* was recently re-released for Windows; alongside that, however, was this even more exciting release – the never-before-seen sequel.

Originally programmed in 1999 by the creator of the original game, Chuck Sommerville, the sequel was never seen the light of day because the company holding the rights was asking too high a price for them. Sommerville resumed negotiations again in 2010, but it would be another five years later before things were worked out and the sequel released.

It's fair to say that *Chip's Challenge 2* is pretty much more of the same, but if you ever managed to finish the original, feel like having some retro Windows 3.1 fun, or just want another set of slightly easier levels to play after getting stuck on the first lot – then this is the game for you. It's currently available in a bundle that includes the first game and a level editor for the same price as the sequel alone – and you don't have to be a puzzle genius to figure out what a good deal that is at just £4. It's Windows only, however.

Gravity Ghost

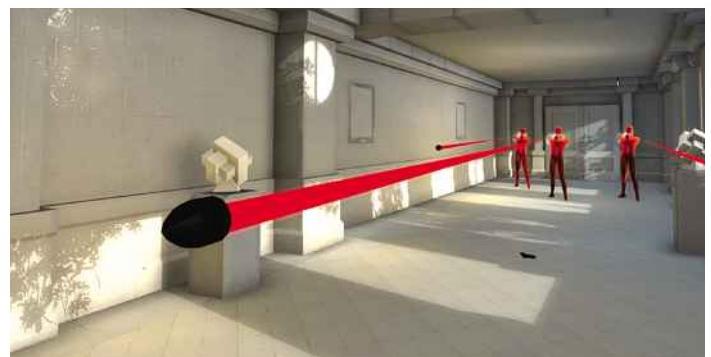
www.gravityghost.com

Physics puzzlers aren't exactly rare, but ones like *Gravity Ghost* certainly are. Rather than basing itself on an abstract world of detached geometry and polygons, like most physics puzzlers do, *Gravity Ghost* has you assuming the role of a young girl's ghost who travels through space with a ghost fox for company. Quite literally, you are a ghost who uses gravity to guide you.

The game's aesthetic is incredibly unusual, linking hard science and mysticism to create an experience that's both educational and emotional. Although it's a puzzle game it's light on difficulty and high



▲ *The Witness*



▲ *Superhot*



▲ Below



▲ Inside

on relaxation, helped along by the wonderful soundtrack by Ben Prunty (of *FTL: Faster Than Light* fame).

Gravity Ghost is both poignant and inventive, and while it never quite feels like it gets deep into the meat of its own mechanics, there's enough here to keep you entertained, even if you won't necessarily feel challenged (that's an assessment as a huge puzzle game fan, your mileage may, of course, vary). There's a good reason that Sony have snapped this up for a PlayStation 4 port with exclusive content, but if you don't want to wait for that, it will cost you £11 (or £15 with soundtrack) to grab it for PC or Mac.

Indie Games of 2015 (Yet To Come)

Guessing release dates for upcoming games is always something of a mug's game, but we've got it on relatively good authority that these titles will be out before the calendar flips over yet again. If they're delayed then we can only apologise for getting your hopes up – but all of them seem close enough to release that you can, if nothing else, start putting your pennies away ready for it.

The Witness

the-witness.net

Sometimes it feels like *The Witness* is destined to do nothing but appear on preview lists for the rest of time, but Jonathan Blow's follow-up to *Braid*, a stunning platformer themed around time, space and love, has been in active development for years now. Recent appearances at game shows suggest that 2015 might be the year it hits the digital shelves, and it's been made clear by its developers that the game is now in the polishing stages, closer to the end than the beginning – though that doesn't necessarily mean anything, given its long development cycle to date.

What's *The Witness* actually about, though? Really, that's less obvious. Even those who've played the public version at game shows like E3 find it hard to describe. We can say for certain that it's a puzzle-adventure game that you play in first-person mode, set on an island full of structures (both natural and man-made) which have puzzles attached to them. If that sounds vague to you, that's probably fair. We're not quite sure what to expect ourselves – but based on the

Where To Buy

Buying indie games is rarely as simple as strolling into a shop and picking them off the shelves. Generally, you have to buy a digital copy and download it – but how do you make sure you're doing so from a reliable outlet? Here are the three main places you might want to look.

Steam

store.steampowered.com

The industry leader in digital gaming, Steam is an all-purpose marketplace that can act as a kickstarter-type mechanism for proposed titles or allow you to pre-download the latest AAA titles so they unlock the moment you're ready. If you don't mind DRM, this is the place to go.

GoG

www.gog.com

GoG used to stand for 'Good Old Games', but these days it stocks plenty of new titles, and even gaming-related movies. Established in 2008, GoG has become a leading provider of DRM-free games and, crucially, just launched a desktop client, setting itself up as the DRM-free rival to Steam.

Humble

www.humblebundle.com

Famed for its pay-what-you-want 'humble bundles', the site also has a more conventional store where you can buy and download games individually at their standard price. Humble's library makes it worth a look – you get easy access to DRM-free versions of software and can administer your account entirely on the web.

screenshots and the sublime gaming experience that was *Braid*, we can't help but be very excited to play *The Witness*, and if that happens this year then we'll be more than happy about it.

Superhot

superhotgame.com

Never let it be said that indie game snobs automatically hate any FPS that involves shooting. To prove it, we're going to tell you to look out for *Superhot*, an FPS shooter with an interesting twist: time only moves when you move. It's essentially an action game without the twitchy reaction times; part-puzzler, part-shooter, all-amazing. At least as far as we can tell.

If you're wondering how the game works, there's no need to try and figure it out from our hazy description of it, because you can play the prototype demo (created in 2013) on the official website now, as



▲ Lovers in A Dangerous Spacetime



▲ Shape Of The World

well as pre-order the full version ahead of its release. It's like playing a game where you've got superhuman reflexes, and the precision and timing required make a uniquely analytical experience out of something that would otherwise be almost reflexive.

In a way, it almost goes to show that sometimes thinking about it does make it worse. If you could fire off a shot and be gone, you'd breeze through the game, but you can't. You have to watch every bullet crawl towards its target.

Originally scheduled for June 2015, *Superhot* has been pushed back to December. It's hard to criticise that delay, though, when the buzz around it is so good.

Below

www.whatliesbelow.com

Capybara Games blew the lid off the indie scene with games like *Superbrothers: Sword & Sworcery EP* and *Super Time Force* with their original retro-tinged graphics and lush rock backing tracks. So it's no surprise that *Below* – the studio's next game (and the second made with the assistance of composer Jim Guthrie) from is getting a lot of attention.

Mechanics-wise, it promises a creative take on the roguelike gaming model of some roleplaying games, providing randomly generated worlds to explore. Survival is the goal and death is permanent, so expect to replay this one a lot. The developers claim it'll punish recklessness, but reward rigorous, methodical gameplay. The fact that they describe the combat as 'fair' suggests that it isn't going to feel that way.

In terms of comparisons, that's harder to say. We're expecting something that's part *Spelunky*, part *Zelda*, but we can't say for certain because not much about the game has seen the light of day. Despite this – based on the studio's previous form – we're expecting to love it, and until anyone says otherwise we'll continue to expect it this year.

Inside

playdead.com/company

Another one from a studio with a prior hit to its name, *Inside* is the follow-up to Playdead's hugely engrossing, evocative and disturbing platformer, *Limbo*. As the saying goes: 'if it ain't broke don't fix it', so *Inside* will be directly following up the aesthetic and themes of that game. So expect visuals as gloomy as they are captivating.

A trailer released some months ago revealed the game as casting you in the role of a small child rebelling against a brainwashed population. Although *Limbo* was in 2D, *Inside* has full 3D environments even though it's another side-scroller. It looks like a tense and disturbing experience, and coming from the people who made the most tense and disturbing game of 2010 by some distance, we suspect that's exactly what people will want.

Inside is currently announced for the Xbox One only, but based on previous form – and the company's Wikipedia page – it's likely that the timed exclusive won't prevent a PC release, which means we could all be playing it by the end of the year. Indeed, it was supposed to be out now but got pushed back into the second half of the year so they could finish polishing. Let's face it, after a five year wait, who can begrudge Playdead not wanting to rush the final days?



Pick up sandwitch

Open Pick up Push
Close Look at Pull
Give Talk to Use

BUS PASS			TUNA

▲ Thimbleweed Park

Lovers In A Dangerous Spacetimewww.loversinadangerousspacetime.com

A crazy Saturday-morning cartoon aesthetic permeates this insane-looking two-player shooter that puts the players and a friend (or AI cohort) in control of a two-seater craft blasting its way through a series of colourful and insane levels. It already has a string of gaming festival rosettes to its name and we're not going to second guess those guys when it comes to picking the best games.

Crucially, this is one of the few games on this list designed for two players and, in that sense, sits in a niche that indie titles often overlook – the multiplayer one. Simple controls belie this title's deep challenge, and a wealth of ship upgrades and randomised levels mean that there are literally millions of experiences on offer.

Between the brain-searing visuals and the chiptune soundtrack, it's sure to be an assault on at least two of the senses. If you're sick of morose, drab indie games and want something that'll clean out the cobwebs, we can't think of a better place to look.

Indie Games of 2016 (And Beyond)

One of the great things about indie gaming is that there are rarely any publishers or financiers to please, so the game only has to come out when it's done (and you don't get any *Batman: Arkham Knight* situations). The bad thing is that if *Duke Nukem Forever* taught us anything, 'when it's done' can mean weeks or years.

That doesn't stop us looking forward to what's coming, though, and while we don't think we'll see any of these in 2015 (we hope to be proven wrong on several counts!) these are the indie titles you should be looking for in 2016 and beyond.

Shape Of The Worldwww.shapeoftheworldgame.com

If you played the transcendent open-world art installation that was *Proteus*, you'll probably love *Shape Of The World*, which employs similar aesthetics and mechanics. In a procedurally generated natural world, your goal is to construct monuments to help you navigate. It describes itself as a game about the joy of getting lost, and being found again, so anyone hoping to speedrun it or collect a bunch of achievements will – we imagine – be slightly out of luck. Nevertheless, *Shape Of The World* would seem to show that there's room for incredibly unconventional projects in the landscape of indie gaming, and if it's half as good as *Proteus* was then you'll want to buy this the very moment it comes out.

Thimbleweed Parkthimbleweedpark.com

If the second and final part of *Broken Age* – a new point-and-click game from *Day Of The Tentacle* mastermind Tim Schafer – wasn't enough to excite you earlier this year, how about one from Ron Gilbert himself? Yes, the much-loved creator of *Monkey Island* and *Maniac Mansion* is returning to the genre that made his name with *Thimbleweed Park*, a retro-inspired adventure in the spirit of his past successes, but with an all-new story and huge cast of playable characters. Funded through Kickstarter (as so much is these days), it's due for release in 2016, and nothing we've seen about it makes us think it'll be anything other than a must-play. Adventure games are one of the most idiosyncratic PC gaming genres around, and that alone should garner it a place in any gamer's list.

Mighty No. 9www.mightyno9.com

Platformers have never really been the PC's natural home, but that doesn't mean there isn't room for them somewhere. If you like *Megaman*-style games or 8/16-bit arcade platformers, then *Mighty No.*

9 is one that's going to push your buttons. Developed by Keiji Inafune – the creator of *Megaman* – and his new company Comcept, *Mighty No. 9* puts you in control of Beck, a cyborg who can steal weapons and abilities from enemies he defeats (a mechanic that will sound familiar). Its thoroughly modern HD visuals are completely hand-drawn, meaning this is a retro experience in feel only, however. Originally due in April this year, *Mighty No. 9* has been pushed back to 2016 – but if you're a fan of the genre, it's should be worth waiting for.

Virginiavariablestate.com/virginia

Developed by fledgling studio Variable State, *Virginia* promises to be an interactive drama set in a world inspired by the offbeat mysteries seen in the likes of *Twin Peaks* and *The X-Files* – those that juxtapose the mundane and the incredible. With a focus on narrative over game mechanics, *Virginia* is silent except for the musical score forcing you to engage with the body language and environments in ways that most games allow you to take for granted. If you liked the thoughtful interactivity of games like *Gone Home*, *Proteus* and *Limbo*, *Virginia* might be 2016's answer to them, so get in on the ground floor.

Heat Signaturewww.heatsig.com

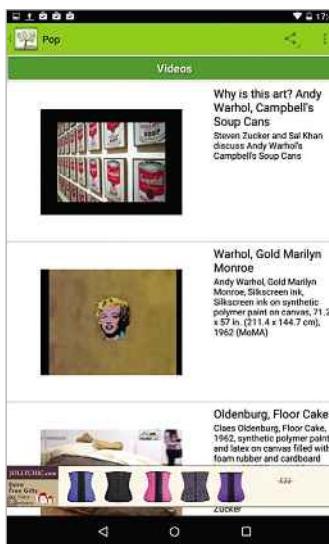
Recently released as an Alpha version (temporarily, at least), *Heat Signature* is the new game from the makers of *Gunpoint*, a noir-ish stealth puzzler that made you feel like an electrical engineering genius just by clicking your mouse. *Heat Signature* promises to be at least as good – a sci-fi game set on spaceships full of guards where death lurks around every corner. It's a long way off complete, but the game's super-informative Twitter account (@heatsig) is documenting every aspect of its creation, with particular emphasis on hilarious and frustrating bugs that turn up. We can't wait to play the game when it's done, but it doesn't look like that'll be this year – we're hoping it won't be beyond the next. mm

▲ *Virginia*▲ *Heat Signature*

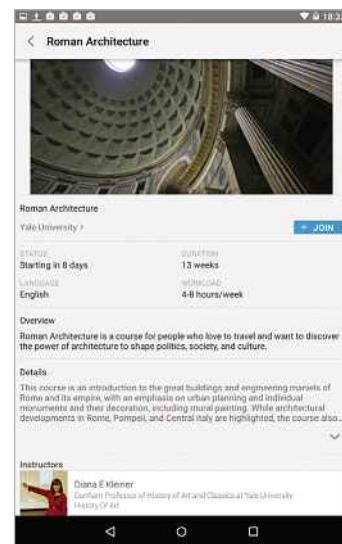


Top Educational Apps For Kids, Students And Adults

Learn new skills, broaden your knowledge and take courses in a wide range of subjects. **Roland Waddilove** presents his favourite mobile apps



▲ Get an app like EasyAccess for Khan to access Khan Academy online courses



▲ Coursera courses run at specific times, so check the starting date and duration

Educational software is strongly associated with children and there are lots of programs for them, but education is not just for youngsters; it should be a life-long activity. We can always look to learn new skills, improve existing ones, and broaden our knowledge at any age and this can benefit our personal and work life. As we will see, there is a lot of educational material for the young, old, and everyone inbetween.

A large amount of educational software is available for Windows PCs and there are some fantastic programs. The disadvantage is that you really need to sit at a desk or table to use it, usually at home or at work. There are advantages to using educational apps on a mobile phone or tablet and the main one is that you can use them anywhere.

Your smartphone is in your pocket or bag and is carried wherever you go. If you are at home, at work, in a cafe, hotel, train station or bus queue, it is easy to get it out and to fire up an educational app if you have a few minutes to spare. You can work through some lessons, read up on a subject and learn new information and skills that can be a great benefit to your personal or work life. Some educational apps are simply good fun and can be used for entertainment too.

Education Apps For Adults

Unlike many articles on educational software that focus on kids, here we will also look at apps for smartphones and tablets you might want to use yourself. You should never stop learning and should always look for new skills to pick up and new knowledge to acquire. After sorting out your own educational needs, some of the best apps for kids and older students are covered in detail.

Courses

Khan Academy (khanacademy.org) is a fantastic resource for people that want to learn something new. There are top quality courses in a range of subjects including maths, science, economics and finance, art and humanities, and computing. In the maths section, for example, are courses on everything from simple arithmetic to differential calculus. Science includes physics, chemistry, biology, cosmology, astronomy and more. If art is more your cup of tea then there are courses on Baroque, Rococo and neoclassical art in Europe, Art of Medieval Europe, and so on. It is a brilliant resource, the courses are written by experts, academics and teachers, and it is free for everyone to access whenever they choose to.

The Khan Academy does not provide an app of its own, but it does allow app developers to access the online materials and a search for Khan Academy at the iOS and Android stores results in several useful apps. For example, on Android there is EasyAccess for Khan, Gallery for Khan, and Viewer for Khan Academy. On iOS there is Khan Academy: Learn math, biology, chemistry, economics, art history... All these apps are free and you can browse the Khan Academy materials and view them on your phone or tablet. This makes it easy to access learning materials no matter where you are and, if you have five minutes with nothing to do, you can easily load an app and continue with a course you are studying.

This is not the only organisation of its kind and Coursera (coursera.org) provides a similar service. There are over 1,100 courses available from 121 partners, mostly top universities from around the world including our own universities of Edinburgh, London and Manchester. A fair amount of the material is very advanced, as you can imagine from the universities involved, but you don't need a degree to understand all of the courses. For example, there is Dog Emotion and Cognition, which sounds like fun; the Introduction to Public Speaking could be useful too. There is also Writing for Young Readers, Astronomy: Exploring time and space and many more to have a look through. Of course, if you want to learn calculus or statistical mechanics, you can do that too. There is an official Coursera app for Android and iOS, which is free – as are the courses. Install the app and start exploring the courses available. With Coursera on your mobile, you can continue studying anywhere.

Brain Training

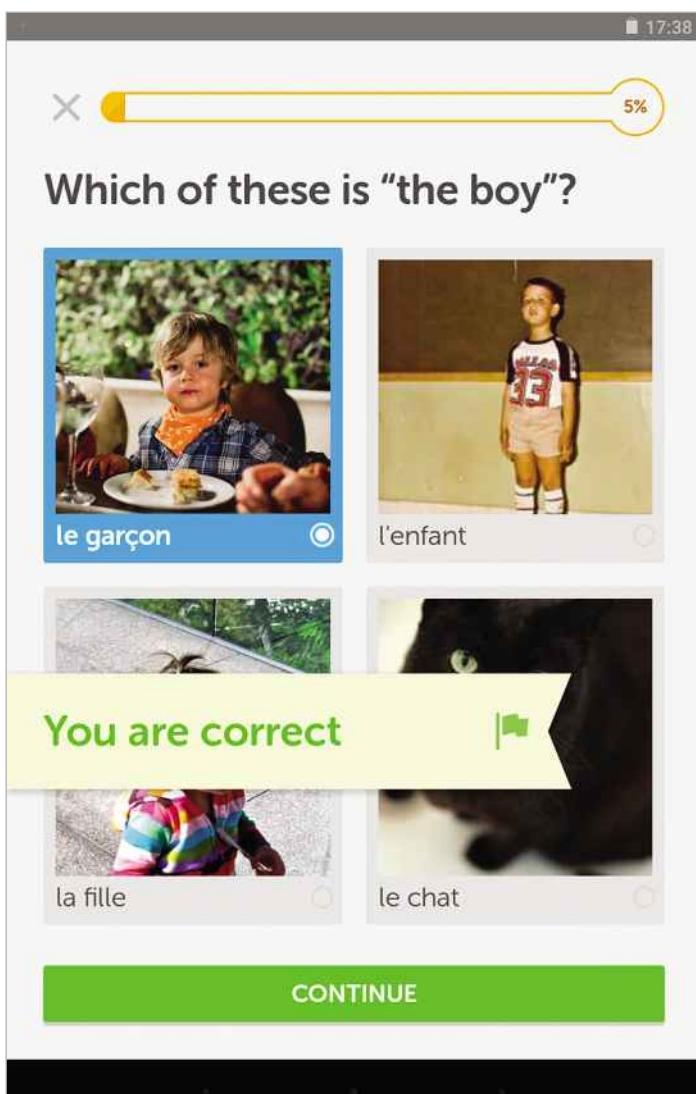
Brain training has become a popular topic in recent years because of the notion that you can improve your mind by playing simple, fun and addictive games. It has become a multi-million pound business and there are numerous companies promoting online courses, downloadable apps, books and other material.

A brain training app is perfect for a mobile phone because the games tend to be simple pattern matching, word puzzles, and mental arithmetic. You get better at whatever activities you practise, so it is best to practise as many different ones as you can. Apps typically contain a collection of games that take just a minute or two to complete and if you load up your phone or tablet with several you will have a wide range of different activities to keep your mind sharp.



▲ Elevate is an excellent brain training app that focuses on real-world activities

▲ Neuronation has a different collection of brain training apps. Sharpen your mind



▲ Learn a new language with the Duolingo app, it is one of the best

Elevate for iOS and Android (elevateapp.com) starts out by giving you a quick test and question and answer session to determine your interests and your current level of mental abilities. It then produces a personalised plan to follow. You play three games each day and they can be completed in a few minutes. A nice feature of the app is that the games relate to real life situations, which is not true of all apps of this type. There are a lot of word games like spelling, syntax, brevity, clarity, and several reading, speaking and listening tests that work on your comprehension. It is easy to see how these can help to improve your abilities and there is useful statistical information about the tests you have completed and your scores.

Neuronation (neuronation.com) is also available on iOS and Android and it provides a different set of brain training games. There are a core of free basic training activities and a free exercise selection, plus many courses that can be purchased from within the app. Some of the games are unusual, such as tracing a path around the screen from dot to dot, a bit like the pattern unlock feature on phones. You have to match shapes by rotating them in your head to see if they match a target shape. Routes around a grid have to be memorised. A shapes and colours get you all in a muddle and focus your attention. The interface is nice and there are some great statistics screens that show your progress. These are just two examples of a large range of brain training apps and there are many more.

Languages

You are never too old to learn a new language and it can come in handy when travelling abroad on holiday or even on business trips if they take you overseas. The most commonly spoken language in the world is Chinese, but that is because the country has such a large population. The second most common language is Spanish and English is only third. Spanish is definitely a language you should learn, but because France, Germany and Italy are popular holiday destinations, speaking a few words of the local lingo can be a big help when trying to find your way around, order food and drinks, and so on.

Mobile phone apps are perfect for learning languages and you can carry them with you when you go abroad. One of the most popular is Duolingo (duolingo.com) and it is available on all mobile platforms. The interface is good and you can select from many popular languages.

It teaches by asking questions, for example, there may be four pictures on the screen with descriptions below and you have to select the right one, or short sentences must be translated to or from the language. Sometimes you must speak phrases and it records and analyses what you have said, or you listen and then type the sentence or translate it. Duolingo is a lot more fun than it sounds.

Alternatives include Learn Languages: Rosetta Stone (rosettastone.co.uk/mobile-apps), and Learn 50 Languages (50languages.com). Rosetta presents lots of photographs that you have to identify, which teaches you the names of objects and activities. Sometimes you have to speak them and the app analyses your speech. Learn 50 Languages has lots of different modules you can dip into, such as a phrase book, alphabet, numbers, vocabulary, and games like Find the opposites, Crossword puzzles, and several more.

Coding

In an increasingly technology dominated world, the need for programmers is increasing and there has been a big push to get children interested in the subject by introducing it into the school curriculum. Coding is not just for children, though, and anyone can learn to write programs. So, whether you think of it as just a hobby or work, a bit of coding experience could look good on your CV and it could even help you get a better job somewhere down the line.

▲ Become a programmer with SoloLearn's range of phone and tablet apps

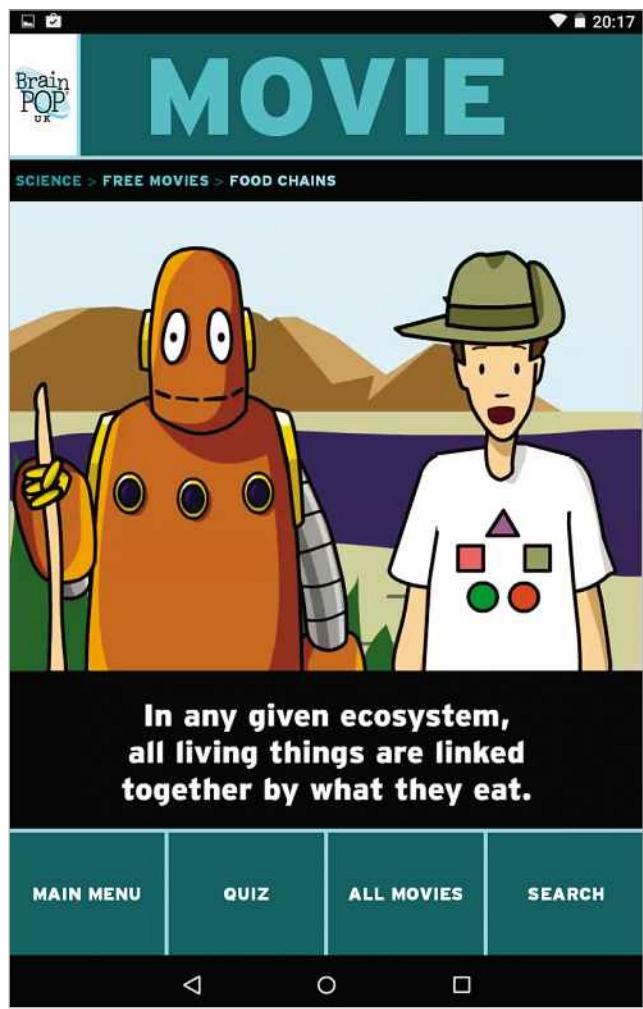
▲ Thiagaraj's programming apps have a similar format to ebooks

Not everyone can become a programming superstar, but coding covers a wide range of applications and even tweaking a WordPress template on your blog requires a bit of coding knowledge. Being able to do that yourself is a useful skill to have. There are numerous websites offering programming courses, but they do not always work well on mobile devices. If you want to learn to study on your phone or tablet it is best to use an apps designed for small screens and touch interfaces.

SoloLearn (sololearn.com) is a developer with a range of free programming apps for Android, iOS and Windows Phone. There are several to choose from, such as Learn HTML, Learn Java, Learn JavaScript, Learn SQL, Learn CSS, Learn PHP, Learn C++, and a few more. The eagle-eyed will have immediately spotted that apart from C++, they are all web technologies of one form or another. C++ is more of a general purpose programming language. All of these are used to create websites and they are a useful resource if you want to improve your skills or become a website developer.

The apps all have the same format and only the content changes from one to another. The subject is divided into logical sections and each has a number of lessons. These typically present some information about the language like a function, syntax and so on. You must read this and immediately afterwards answer a question on it. You must get it right in order to proceed.

There are usually two or three questions in each lesson and there can be 15 or more lessons in a section. The question format varies and sometimes you must rearrange items in a list or fill in the blanks in code. The apps are simple, but good enough to get you started.



▲ BrainPOP shows short animated movies packed with educational content

Thiyagaraaj M (bit.ly/1UhV6rt) also has a range of Android apps for learning to program and the languages covered include Java, Python, C, C++, PHP, Perl and a few others. The apps are not interactive and they are more like ebooks. There are chapters and topics within them, and you can jump around, dipping into a topic here, looking up something there and so on. There are exercises to perform that test your knowledge, such as by writing a bit of code, and there are example solutions in case you get stuck. There are also quizzes that test your knowledge and answers are provided.

There is a lot of reading in these apps and they could be used to support other programming courses. They are free, which is nice, but they only work on Android phones and tablets.

DIY

There are many more educational apps covering a wide range of subjects. For example, you could learn to become a carpenter with Carpentry Course (bit.ly/1Knms01), an app that provides guides to woodworking techniques, making cabinets and custom furniture and so on. The same developer also has a Plumbing Course (bit.ly/103g8ls) where you can learn to unblock sinks and toilets, thaw a frozen pipe and more. Follow the developer links for more courses.

Education Apps For Youngsters

There is a wide range of apps for children and they not only keep them entertained, they educate them as well. It might look like your child is simply playing, but they are learning new skills and acquiring new information and insights. There are apps that are just for



▲ Starfall Free has some useful activities for children, with more for subscribers



▲ Cbeebies Playtime is a bundle of top quality games with educational content



▲ CBeebies Storytime contains a library of stories for children to read or listen to for free

fun, but others support schoolwork and help with the topics that children cover in the classroom.

A great learning resource is BrainPOP Featured Movie, which is aimed at 9-11 year olds, and BrainPOP Jr. Movie of the Week for 6-8 year olds (brainpop.com/about/mobile). These are not ordinary movies, but are animated educational ones that support classroom topics. Children can watch a different animated movie every day and the subject ties in with current or historical events, figures and holidays. Afterwards the child can take an interactive quiz that tests their understanding of the subject matter covered. These apps are excellent and the movies are packed with good educational content. They run on Android, iOS and Windows.

ABCmouse.com, subtitled The Early Learning Academy, is an Android and iOS app that provides 5,000 educational activities for 2-7 year olds. It does have a lot of content and it is highly rated in the stores, but you have to subscribe to use it and it costs \$8 a month.

The Starfall website (starfall.com) also requires a subscription but, at \$35 a year, it is much cheaper. The iOS and Android Starfall Free apps have a certain amount of free content aimed at children up to the age of five, but these are basically samplers until you sign up. Even so, kids can have fun exploring the sample activities and there are quite a few to play, certainly enough to keep them quiet for a few hours.

CBeebies, the children's TV channel by the BBC, has two good apps for youngsters and both are free on Android and iOS. BBC CBeebies Storytime is a bit like a children's version of the Amazon Kindle app and is packed with books. It is great for parents to read with younger children or for slightly older ones to read by themselves. There is also an option to have the book read to you. The app and the books are all free and you or your child can visit the library, select books and download them for reading. It has brilliant graphics and good stories that your children will want to read over and over again.

CBeebies Playtime is a collection of entertaining games for young children, but they also have educational content too. The graphics are excellent, the games look superb, and regular viewers of CBeebies will find lots of their favourite shows and characters featured.. There is Alphablock, Octonauts, Tree Fu Tom, Furchester, Something Special, Andy' Dinosaur Adventure, Swashbuckle, and more. These games are brilliant.

Nimble Minds (nimble-minds.com) has a small collection of apps for pre-school children, such as Kids Learn To Read Rhymes, Words for Kids, Reading Games, Word Morph!, Brain Booster and others. Once you have found one app just click the developer link for the others (use this trick with other education apps too). Some apps are



▲ Words for Kids is one of a series of pre-school apps from Nimble Minds that are worth checking out

free and others are Lite versions with in-app purchases. The games feature bright and colourful graphics and are fun for kids, which is an important consideration. Children will not use apps that are boring.

First Words, for example, has Learn and Play options. There is a choice of everyday situations like the bedroom, bathroom, breakfast, classroom, playground, park, and so on. Select a situation and in Learn mode you can tap objects in the image and see its name. In Play mode an object is spoken and written and it must be found in image. Kids will love it and there are others in the series.

Intellijoy (intellijoy.com) is another developer with a range of kids apps for Android, iOS, and even Blackberry. The company claims to have clocked up over 40 million downloads and the apps are bright, colourful, cheerful and fun. The apps for three to seven year olds include Reading Games for Kids, Kids Games Shapes for Toddlers, Learn Phonics - ABCs Preschool, Kids Telling Time and others. Some apps are free while others are Lite versions with in-app purchases to unlock the full version. They will keep your youngsters amused and they will learn at the same time.

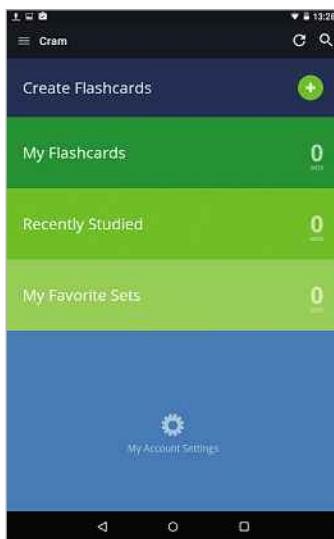
Encyclopaedia Britannica has nine Android and 16 iOS apps. Most of the apps are aimed at older children and examples include Snakes, Volcanoes, Dinosaurs, Rain Forests, Solar System and so on. These contain lots of information, photos, jigsaw puzzles, quizzes and more. None are free, but several cost just £1.24 and a few are £3 or £4.

Bridge Building

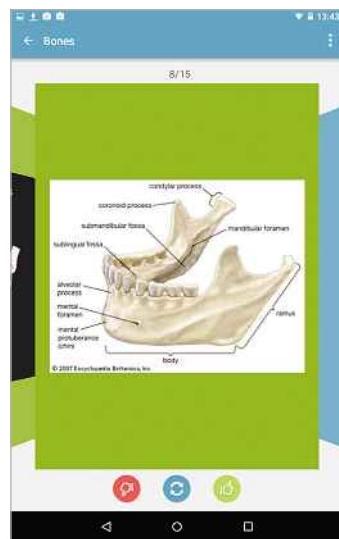
There are a couple of Bridge Constructor variations in the iOS and Google App Stores: the original, PG (Playground) and Medieval versions alongside many playing guides. The aim of the game is to build bridges (to state the obvious) and playing it might encourage an interest in engineering in students. You are given the task of building bridges over valleys, rivers and canals. You have concrete, wood, steel and steel cables and you place surfaces, girders and wooden beams in such a way so as to firstly support the bridge's own weight and secondly to support the extra weight of cars and trucks. It is more of a fun game than a perfect simulation of engineering and bridge design, but it is educational and it gets you thinking about why one shape or structure can bear weight, but others cannot.

Education Apps For Students And Teens

There are apps for older students studying for GCSEs, A-levels, college and university courses and they range from study materials revision aids to apps that help them in other ways, such as organisers for example. An organiser is not the first app that comes to mind when thinking of apps for students, but there are quite a few of them.



▲ Cram has millions of flash cards to download and you can create your own as well



▲ GoConqr is an excellent flash card app with lots of high quality content to explore

Students have classes and a timetable that tells them where they must be, at what time and on what day. An organiser on a mobile phone can store the timetable and it takes just a few taps to see what is coming up next or later today. There is coursework and projects to be completed and these activities can be tracked to make sure they are not forgotten about. Exams are hard to forget, but students need to revise for them and planners can help with that by allocating time and recording time spent revising. These apps can remind students of events, such as when exams are to be taken, when homework or coursework is due, and so on.

Scheduling/Planning

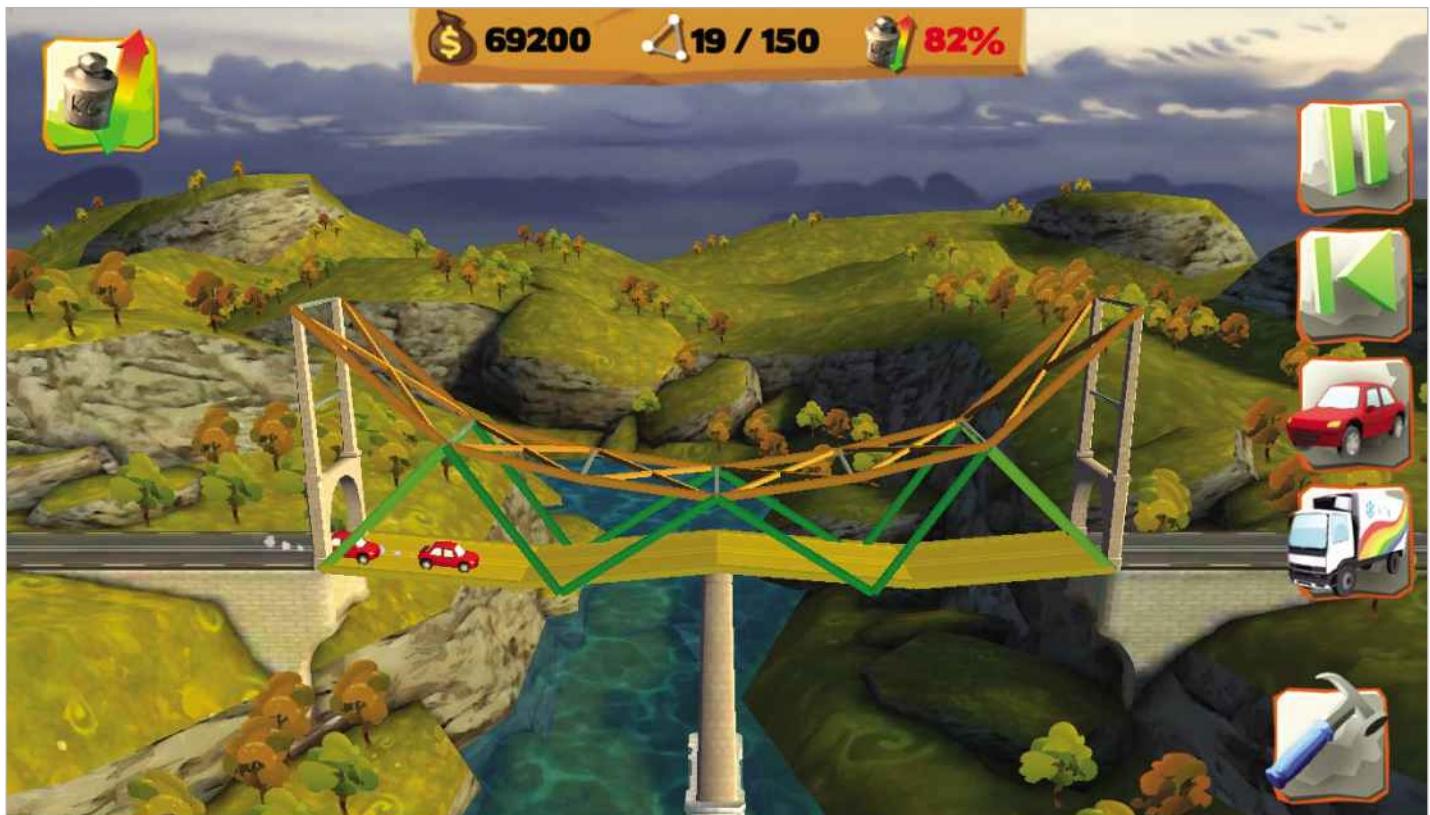
My Study Life (mystudylife.com) is typical of this type of product and it is a website, Chrome extension, Windows App, and Android, iOS and Windows Phone app. It runs everywhere. The colourful home screen shows tiles with activities today like classes and exams, tasks that are due, exams coming up in the next week and revision tasks completed. Week and month calendars show upcoming events, and the schedule is a text listing of classes and times. Homework assignments and other tasks can be recorded and reminders are displayed. This is a very useful app for older students.

Flashcards

Flashcards are a useful way to learn and to revise for exams. They can be physical cards and each contains information, such as a key fact that you need to remember. There may be a question on one side of the card and the answer on the other and you can test yourself, learn the key facts in a subject and improve your memory.

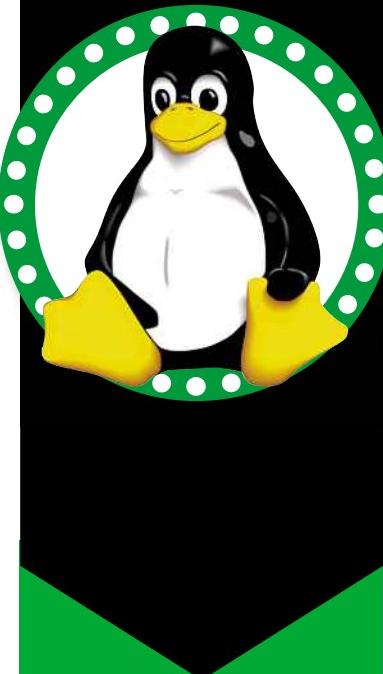
There is, of course, an app for that. In fact – many, in fact. If you want ready made cards then Cram (cram.com) for iOS and Android is pretty comprehensive, with over 75 million cards available. However, it is hard to find the subject you are studying and the level you want because there are just too many cards and it is a bit disorganised. You can create your own cards, though, and this activity helps you to learn too, and whenever you have a minute to spare you can get out your phone and swipe through a few cards to remind yourself of key facts.

GoConqr (examtime.com/guide/mobile-apps) is another flashcard app for iOS and Android. There are premium accounts, but it costs nothing for up to three subjects. In addition to flashcards, there are mind maps, quizzes, slides and notes; the quality seems higher and it is easier to find what you want. Flashcard and mind maps show the number of views and pins, which makes it easy to see the most popular and therefore the best resources. You can also see other resources by the same author and related resources. mm



▲ Bridge Constructor could stimulate interest in engineering in children and teens (and adults, probably). It's also fun

Specialists



David Hayward has been using Linux since Red Hat 2.0 in schools, businesses and at home, which either makes him very knowledgeable or a glutton for extreme punishment

Linux

Linux AV

Linux isn't immune to viruses

Linux is completely virus free. You can surf anywhere you like, download anything you like and you'll be completely safe."

Believe it or not, I once sat and listened to a supposed Linux guru spout the aforementioned sentence with absolute confidence. I'm afraid to say it, but Linux is not Superman; it's not indestructible. Can you recall the legend of David and Goliath? There will always be some bald-headed evil genius with a lump of Kryptonite or a youth with a handful of stones and poor eyesight ready to bring you down.

Okay, so finding a working non-root virus on Linux is significantly more difficult than with Windows, but you have to agree that in this day and age and with malware on the up, we have to protect our machines as much as possible.

Linux has avoided malware mainly through its small market share; if it was used by 60% of the PC owners in the world, then you can rest assured that some electronic vandal would turn on the penguin and infect it with all sorts of nasties. That's the way of the world I'm afraid.

However, even a small market share these days means very

little, and with so many Linux vulnerabilities now in the public knowledge, perhaps now is a good time to consider installing an anti-virus client.

AV For Linux

We thought, therefore, a brief round-up of Linux AV clients could be a good idea. And here's what we came up with:

Avast File Server Security

Although it states File Server Security, this Linux security suite from Avast features an on-demand command line scanner, as well as real-time security.

AVG Free Edition For Linux

Another command line scanner, this time from AVG. There are on-demand scans available, as well as file access scans, and it comes with plug-ins for mail filtering and Samba shares.

BitDefender Antivirus Scanner For Unices

Although a more business and commercial focused scanner, this GUI-based AV client from BitDefender is one of the best available and does pretty much everything you can think of from an AV scanner.

Clam Antivirus For Linux

Clam is an open-source anti-virus engine, which makes it one of the more contested in the list, due to its open nature. It's a command line scanner and looks to do a good enough job.

Comodo Antivirus For Linux

This is another GUI-based scanner that's designed to a high standard. There are real-time scanning components and many options for mail gateways and traffic filtering.

Dr. Web Antivirus For Linux

Dr. Web may not be as well-known as the other examples here, but it's actually a pretty good GUI-based AV client. There's real-time protection, on-demand scanning and even web protection that works with most browsers.

As you can see, there are a few examples to have a look at, but of course, there are many more Linux specific AV clients, each offering a certain extra or better control over the system.

Either way, it's certainly a good idea to start thinking of installing an AV scanner, if you don't already have one on your Linux system. Just in case.

The screenshot shows the Dr. Web for Linux application window. At the top, it says "Dr.Web for Linux". In the center, there's a penguin holding a green shield with a white logo. Below the penguin is a message: "Drag files here or click to select" with a downward arrow. To the right, there's a sidebar with icons for "Spider Guard Enabled", "Spider Gate Enabled", "Scanner Scan your files and directories for threats", "Update Last update: 17:25 19/11/2014", and "License". On the right side of the main area, there's a text box with the caption: "Think you're immune to viruses just because you use Linux? Think again".

Kickstart Your Amiga

Sven looks at Amiga crowdfunding

You can't have missed the fact that there have, rather appropriately, been a number of Amiga-related Kickstarter campaigns. It was a shame that the last one mentioned on the page, to create new Amiga 1200 casing moulds, failed to reach its funding goal (but not by much, and the campaign, to be honest, ran for too short a period, in my humble opinion).

Fortunately, Phillip Lang and his team have decided to rerun the campaign for the new case production and run it for a longer period.

The campaign is to bring new Amiga 1200 cases to reality using plastic that will resist turning yellow with age, as they feature UV resistance. The lowest pledge to get a casing is €79, but considering the limited small run etc., this is reasonably good value (approx £55 before shipping).

The case design has been updated a bit since the original Kickstarter attempt, with Amiga, Inc. now officially licensing the Amiga logo and boing ball to the team for inclusion on the case, so it will have the proper and correct Amiga logo embossed into the plastic where it was on the original.

However, these are enhanced casings with easy cut-outs and custom blanking plates for various popular A1200 enhancements, including holes for a CF card, a trapdoor expansion cover with ventilation, rear blanking plate with HDMI or DVI out and a display slot for the read out from the HxC floppy disk drive emulator (see **hx2001.com**). They even have a set of embossed signatures inside, A1000 style!

The casing is being designed to not only take any revision of the Commodore or Amiga technologies A1200 motherboard (and thus the up



▲ The special silver edition of the new case

and coming Amiga Reloaded AGA motherboard from Jens Schönfeld's Individual Computers, all being equal), but can also house a Raspberry Pi 2 or MiST board.

What's more, colour options are available, including (more expensive) limited colour runs and the option to have a different coloured top and bottom (red and white, anyone?)

The campaign runs until 1st of November, and at the time of writing had already hit over 50% with 50 days still to go! Check it out at kck.st/1hTsOrz.

Mechanical Keyboard Caps

After a very successful Kickstarter campaign to ensure his X500 Evo computer casing was produced (this is going back a couple of

years), Solihull based Loriano Pagni has started a new campaign to get replacement keycaps produced for Cherry MX switched mechanical keyboards.

The pledges start from £8 for a pair of Amiga keycaps as they were on the original Amiga keyboards (one solid lime green bold italic, and one outline one), with other options including a boing ball or MorphOS butterfly keycap to replace the menu keycap. It even includes the option for a full colour boing ball and even a extra keycap with your own picture on!

With a successful Kickstarter campaign under his belt and such a low starter price, it certainly is worth a look if you prefer your keyboards properly mechanical. Check it out before the 25th of October at kck.st/XaP7Jw.

Mouse Anyone?

A-Eon Technology has announced a new version of its boing ball mouse, which is to have a standard nine-pin D connector and be compatible with classic Amiga machines such as the A500 and A1200.

A variation on the normal USB (and PS/2 compatible via an adaptor) boing ball mouse originally produced for AmigaOne (AmigaOS 4.x) machines, it features a scroll wheel that doubles as the third mouse button, which can be used with Freewheel for Workbench.

The white mouse is available for £25 plus postage from www.amigakit.co.uk.



Sven Harvey has been our Amiga specialist for over 16 years, drawing on his 25 years retailing computer and video games and even longer writing about them

A
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Ian McGurren is a professional IT analyst, a semi-professional writer and a pretty amateur electronic musician. He likes gadgetry and loves making gadgets do things they were never designed to do

Mobile

Go Pro

Ian McGurren check out the big picture on the big tablet

Despite initial misgivings, it's fair to say that the iPad has been successful in many areas that a large version of an iPhone wasn't initially even considered for. Initially seen as a big browsing and media device, the iPad has branched out to so many different areas, it's started to change things as fundamental as education and medical care. The iPad has even found its feet in the previously Microsoft-dominated world of enterprise, leading toward a genuinely paperless and connected working environment.

While the iPad has generally been seen as being in a Goldilocks-zone for size and weight – the iPad Air especially – there has been some clamour for a larger iPad to offer a sizable alternative to ultrabooks and, to a lesser extent, Windows tablets such as Microsoft's now highly regarded Surface range. The desire for a larger tablet has also come from other areas such as digital artists and musicians. And now, it seems, Apple has capitulated, with the iPad Pro.

Like the iPad is to the iPhone, it's easy to imagine the iPad Pro as just a bigger iPad, and yes, at the basic level, it is. However it's the size bump, coupled with a resolution and hardware bump, that makes the iPad Pro more than just 'bigger'. The specs might not jump out as much bigger, but the screen of the iPad Pro is as wide as the iPad Air's is tall, with the resolution now at 2732x2048 (that's 2,449,408 more pixels than the standard Retina display). No, it's not 4K, but really, would the extra grunt needed to run that kind of screen right now (and cost) really herald much of a better result, especially when using iOS9's new side-by-side apps mode? Businesses will also



▲ Clearly, Apple is thinking big

find favour that it more-or-less accommodates a page of A4 at full size.

Obviously to run this extra screen real estate will take more power, and in the iPad Pro, it comes in the form of the next Apple iOS CPU, the A9x, the big brother to the iPhone 6S's A9 CPU. Although Apple claims the A9x is roughly twice the power of 2014's iPad Air 2-powering A8x – as it needs to be to maintain the performance status quo on a device nearly twice as big – Apple is instead talking up the A9x's comparison to traditional PC CPUs, calling it a desktop-class CPU, though confusingly then comparing it to laptop chips. It claims it's faster than the chips in 80% of mobile PCs, which on the surface is an impressive boast. Scratch under the surface, though, and in reality, many of those are terrible processors in modern terms, with some high-end Android tablets also boasting powerful and actual x86 CPUs.

It's here a comparison should be looked at, if Apple is going to push the iPad Pro as a laptop alternative (its Surface-like keyboard-cum-cover appears to confirm this), then there are still some fundamental tasks that the simplest laptop can do but iOS

cannot. In the ninth revision of iOS, we still cannot access the file system in any meaningful way, nor use USB. Want to load a film or music onto your iPad? It's still via iTunes. Accessing documents in MS Word for iPad still needs to be done via an external cloud drive too, and if big business wants a device to replace their laptops but still access network drives easily, then iOS will be a hindrance.

For a section of the professional market, however, the iPad Pro will be a nice alternative (though still not a must-have). Digital art, in combination with the Apple Pencil and the screen's enhanced digitiser, should make the already impressive art apps even more realistic and might bring the desktop and tablet closer together. Wacom may not be worried yet, but this is the biggest blow yet.

The iPad Pro is, for Apple, a little less of an assured product. It's a powerful, larger iPad with an improved spec, but there is little of what the firm showed on it that couldn't have been performed on the iPad Air 2. Like the Apple Watch, it smacks a little of a solution looking for a problem but, as the premium iPad device on the market, it's impressive all the same.

Worried You've Left The Iron On?

Andrew Unsworth continues his search for life-changing smart-home tech

Over the last few weeks, with the exception of last week, where I waxed lyrical about a gadget that might stop commercial drivers crashing their vans and lorries into a local bridge, I've loosed my inner luddite and complained that I just can't get excited about smart-home and home automation technology. The Nest Thermostat took my fancy, but it isn't suitable for me, because I'm always hot and therefore rarely have the heating on. It looks neat, though, and under different circumstances I'd probably snap it up.

Another stream of smart-home technology revolves around home security and home monitoring. I've used this kind of technology before, but it's either been too simple, or too fiddly and involved for my tastes. Perhaps a bit of smartness is what's needed?

One manufacturer that's recently announced a new range of smart-home products is Panasonic, which has designed its smart-home offerings around peace of mind and security rather than bare-faced laziness, which is a good thing. Panasonic's system (tinyurl.com/qfaz6rb) can be used to set up cameras, window sensors, motion detectors and smart plugs that work together to make sure your home is as you left it or, if I had one, to make sure the iron's unplugged. For me, this system is all about easing anxiety, because it lets you check your home to make sure your windows or doors are closed, and lets you view your home remotely via a smartphone or tablet.

The system is comprised of a Home Hub that connects to your router and allows the various smart accessories and peripherals to communicate, and two or more accessories depending on

which pack you choose. The base pack (£130) consists of a Home Hub, a window sensor and a motion detector, while the top-end kit (£230) is comprised of a Home Hub, an indoor camera, two window sensors and a smart plug.

The smart plug gives you the ability to switch whatever's plugged into them off and on, which could be handy for turning off a tumble drier remotely or something more exciting. The indoor cameras allow two-way communication, which means you can communicate with someone remotely, perhaps to shout at the kids if they're playing with mum or dad's computer again. Panasonic gives the example of communicating with a delivery driver who's delivering a parcel to your home when you're not there.

The various bits of kit communicate via DECT ULE technology. DECT is the commonly used technology for cordless phones, while the ULE part stands for ultra-low energy. The purpose of DECT ULE is to provide communications products that can transmit and receive voice, video and data at a very low energy consumption, that don't interfere with other communications technologies and that are compatible with each other. Users can pair all the devices together with one touch, so setup should be easy.

I like the sound of this kit, and I'm giving serious thought to getting the base kit and a camera, but it doesn't really seem that smart to me, and there are many other home monitoring kits out there that may suit me better. The search continues.



Andrew Unsworth has been writing about technology for several years, he's handy with a spanner, and his handshaking skills are second to none



ExtremeTech

Specialists



Ryan Lambie has loved videogames since he first stared up in awe at a *Galaxian* arcade cabinet in his local chip shop. 28 years on, Ryan writes about gaming for Micro Mart. He's still addicted to chips and still useless at *Galaxian*

Gaming



This week, Ryan takes a look at the Need For Speed and Hitman reboots, and looks ahead to the long-awaited return of Tom Clancy's Rainbow Six...

Plug & Play

Very different games they may be, but EA's *Need For Speed* and Square Enix's *Hitman* are both at a similar creative crossroads right now. Both franchises are well over a decade old, both have been deemed popular enough to inspire spin-off movies, and both games are about to undergo a reboot.

When EA was pumping out new franchise entries at the rate of one or two per year, *Need For Speed* seemed in serious danger of running out of steam. Now, though, it has found a permanent home with Ghost Games, a studio that previously developed 2013's *Rivals*. It's task is to rejuvenate a franchise that's been around since the 1990s and that – as Ghost's boss, Marcus Nilsson, admitted back in 2013 – needs to "re-establish its credibility."

At first glance, the new *Need For Speed* doesn't look particularly revolutionary: It offers the same fantasy of hurtling around city streets in modified sports cars we saw in, say, *Need For Speed Underground* back in 2003. Ghost, however, seems to be attempting to make a version that incorporates just about all the mechanics and ideas seen in earlier entries: street races, car modifications and high-speed police pursuits. It even employs the device of using live-action footage to tell an unfolding story that echoes 2003's *Underground* as well.

What Ghost seems to be aiming for is a definitive version of *Need For Speed*; a game that takes the best of the racing series while, if all goes to plan, avoiding the bumpier moments in its long history.

The forthcoming *Hitman* has a similar task ahead of it. *Hitman: Absolution*, released in 2012, wasn't quite the critical success its makers surely wanted, even though its sales were healthy. Clouded by pre-release controversy surrounding its marketing and marred by mixed reviews, *Absolution* was widely described as a misstep in a once-great stealth series.

Now simply called *Hitman*, the latest game sees developer IO Interactive return to the series' roots. Levels will be more open and less linear than *Absolution*; the phrase "world of assassination" has been bandied about by its publisher Square Enix. The traditional aspects of the *Hitman* series will be joined by something that wasn't thought of back when it began in 2000; after launch, IO



▲ ...while IO Interactive's *Hitman* responds to *Absolution's* mixed reviews with less linear levels and regular updates providing "an ever-expanding world of assassination".



▲ The Rainbow Six franchise returns after a seven-year hiatus with *Rainbow Six Siege*. Its tactical online co-op mode could really set it apart from other online shooters.

will continue to add new levels as free updates, creating what's described as an "ever-expanding world of assassination."

Like *Need For Speed*, *Hitman* will offer a mix of the familiar and new, the tried-and-trusted and the modern. Only time will tell whether they'll provide the fresh start their creators are hoping for.

Need For Speed is out on November 3rd, while *Hitman* launches on December 8th.

Online

Hitman and *Need For Speed* aren't the only franchises making a high-profile return this year. The *Rainbow Six* games have been around in one form or another since the late 90s, but the series has lain largely dormant since *Rainbow Six: Vegas 2* in 2008. Part of the reason for this was *Rainbow 6: Patriots*, the shooter sequel announced in 2011, only to be cancelled in 2014.

Rainbow Six Siege is its replacement, a version of the tactical shooter that involves, among other things, storming buildings and foiling the nefarious plans of terrorists. Where *Patriots* looked like a somewhat

generic shooter with only scant connections to the earlier games, *Siege* sees a renewed focus on strategy and cooperation.

To emphasise this, Ubisoft has launched Art Of Siege, an "online training platform" which gives players the chance to test-drive *Siege*'s core mechanics. Essentially, it's like a web game where the path through each mission is affected by split-second decision-making. Do you mount a full-frontal assault on the enemy, defend your current position or head to an elevated spot for a bout of sniping? Completing all five missions will give players access to *Rainbow Six: Siege*'s closed beta phase.

Art Of Siege is a cunning way of introducing the kinds of scenarios we'll see in the finished game, as well as showcasing the way a tactical decision like knocking down a wall, splitting up your team or throwing a grenade round a corner can change the entire course of a mission. It's this emphasis on tactics and working cooperatively as a team that is likely to become *Siege*'s most enticing selling point.

What we've seen of the game's multiplayer mode looks highly promising, with missions reliant as much on planning and communication with your fellow operatives as they are on an expert aim with a gun. *Siege* isn't just about gratification, but about suspense; the game's destructible environments mean you can smash through walls or floors and take enemies by surprise. The downside, of course, is that they can easily do the same to you.

It may have been seven years since the last *Rainbow Six*, but if *Siege* can deliver on its promise of tactics and intense action, it could prove a triumphant return for the series when it appears on December 1st.

Incoming

It could be nostalgia talking, but we have an unusually positive feeling about *Transformers: Devastation*. Sure, games based on Hasbro's robots in disguise have disappointed in the past, but *Devastation* has a real pedigree. It's the creation of Platinum Games, the studio behind such acclaimed titles as *Bayonetta* and *Metal Gear Rising*, and like

those games, *Devastation* is a third-person brawler with a bewilderingly fast pace.

As Optimus Prime, Bumblebee, Grimlock or one of any number of other Generation One Transformers, you can unleash fast and deadly combos in vehicle or humanoid form. Bumblebee's light and fast, and capable of ramming evil Decepticons in mid-air in his Volkswagen Beetle guise. Optimus Prime's less agile, but has a strong side-kick and can release devastating energy blasts. Hulking Dinobot Grimlock, meanwhile, can spin-attack and stomp enemies into submission.

Brought to life with cel-shaded graphics, *Devastation* looks uncannily like the old animated TV show some of us were enthralled by as kids. The studio's track record with the fighting genre, and its apparent efforts in recreating every rivet and contour of these much-loved toys, gives hope that *Devastation* could be a Transformers game that is actually worthy of our attention. Don't let us down, Platinum Games.

Transformers Devastation is out on 9th October.



▲ Could Platinum Games be the studio that finally makes a classic *Transformers* game? *Transformers: Devastation* certainly looks like a promising brawler...

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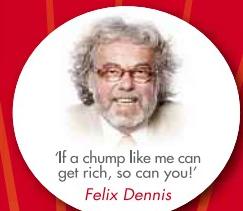
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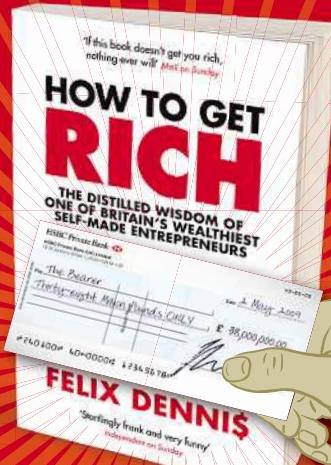
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HP Microserver n40l / windows 7 Pro / 4GB RAM / 400GB drive / MS Office 2003. This HP n40l Microserver is in excellent condition and comes with Windows 7 re-allocated, activated & updated Feb 2015. Also installed is Minitools Partition Magic, MS Office 2003 HP basic, with codes/COAs. Buyer may have Linux Mint, or a completely bare drive. 2 spare drive frames. I have the original packing as per HP original delivery. So far as I can see, this Microserver will take 16GB memory and up to five drives. See it working before buying, (by arrangement). No refund under any circumstances. Collect from Harrogate, North Yorkshire. £140. Cash on collection.

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Kingston HyperX 2x2GB DDR2 1066MHz RAM. Tested and removed from a working environment. £45 inc Free Courier. Payment via PayPal. *Email: info@jmcomputing.info*

2x 512MB PC3200 DDR400. Two sticks were removed from working system. £5, plus £1 P&P. *Tel: Alan (02084) 202322*
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Email: KG_Earl@hotmail.com

WANTED: PC Tower case (beige colour if possible) to rehome an Amiga A1200 vintage computer. The Amiga motherboard is H 410mm x L 190mm (H 16" x L 7.5"). PSU not an issue but if available 250 watt more than enough.
Tel: Bill (07742) 061569 or (02641) 769503.

WANTED: Fractal Design Define XL full tower case. R1 (original version) in black.
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Email: cresswellavenue@talktalk.net

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Microsoft Office 2013. Original Software only £100.
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SOFTWARE WANTED

Wanted: Driver disc for Toshiba L30-11D PSL33E laptop. Laptop useless without drivers but only worth £40, so cannot pay a lot.
Tel: John Udall (01384) 824494
Email: john.udall@blueyonder.co.uk

Wanted: PictureToExe software, for making picture shows.
Tel: (01202) 610602
Email: ivor.mary@talktalk.net

Wanted: Quicken 2001 UK Edition. I need to reinstall the program, but have lost my original installation CD.
Email: david.maddams@icloud.com

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- Keep copies of all correspondence

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Please try to keep your queries brief and limit them to just one question per letter, simply so we can squeeze in as many as we can each week. Please include relevant technical information too.

Aaron

Missing M3

Having been an avid reader and subscriber of *Micro Mart* for a few years now, and I wonder if you might answer my question:

From previous issues of *Micro Mart* I have followed your advice and purchased a Samsung M3 hard drive and used this in conjunction with the software also previously advised in your fine magazine, Ocster Backup.

Having just upgraded to Windows 10 I now find that the M3 hard drive is no longer visible and, as a consequence, I can no longer access my stored data or update my backups.

I do hope that you can answer my query and advise me as to how I can get both operating efficiently once more.

Alan

I'm fairly sure your issue here isn't necessarily down to the Windows 10 upgrade, but simply one of Windows' all too common quirks when it comes to USB devices. You see, these devices (often hard disks) seem to disappear all the time, with causes that are varied. Sometimes the problems are software-based, and can be easily fixed, and other times hardware is at fault. Let's hope it's the former.

The first thing I'd do is check within Disk Management to see if the drive is detected at all by Windows. To get to Disk Management in Windows 10, right-click This PC and then go to Manage > Disk Management. You'll see a list of drives, along with a graphical representation of the disks and partitions below.

Have a look here to see if the Samsung is detected. It should be listed as a removable disk, but may or may not have a drive letter assigned. If not, try right-clicking the drive and selecting the option to change the drive letter and path. This may help, but it's not guaranteed.

I'd also advise you try the drive with another PC or laptop too, as this is a very easy test to

see if the drive is at fault. Trying a different USB cable and port is also a good move. The simple things should always be tried first, before you spend too much time on more complex, or expensive solutions.

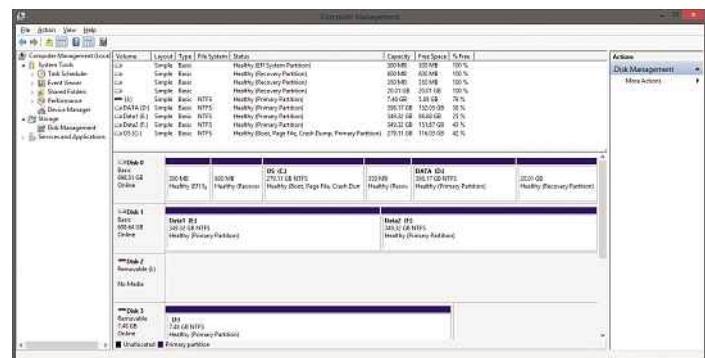
As another test, you could try running a program like Hard Disk Sentinel (www.hdsentinel.com). You can download a free trial of the software, which will scan your PC for drives and analyse them for issues. This may help diagnose any potential problems you may have; if it detects the drive and reports no issues, it's a good sign the issue lies with Windows, not the drive. If it doesn't detect the drive, or simply detects the bridge (the circuitry within the drive caddy), the drive could be at fault.

Often with USB hard disks, the problem can lie with the drive enclosure. If this is the case, you can open the enclosure and remove the actual hard disk. This can then be connected internally to the PC, often with good

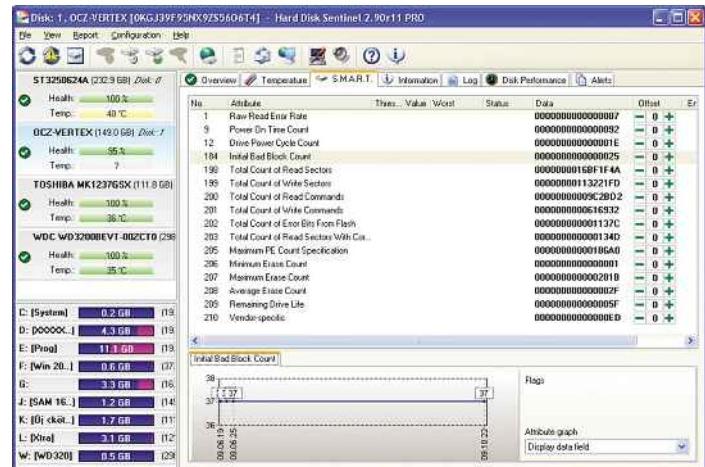
results. Of course, this will void any warranties, so only do this if you're no longer covered, and you're confident in your furling abilities.

If the issue is with Windows, and not the disk itself, try this. Go to Device Manager in Control Panel and look through the list for Universal Serial Bus Controllers. Expand this entry and look for any instances of an unknown device. If you find any, double-click the entry and select the option to uninstall the driver. With this done, reboot your machine and Windows should reinstall the required drivers. You may need driver disks for your motherboard, so be sure to have any setup media handy, just in case.

We can't ignore the possibility of a dead drive. Let's hope that's not the case, but if the drive doesn't work in other devices, the drive itself could have issues. If so, it'll possibly need to be replaced.



▲ Windows' Disk Management should detect and assign a letter to all drives



▲ Programs like Hard Disk Sentinel can analyse hard disks for any potential issues

Autosave

Thanks for answering my question on the best way to Partition my new Hard Drive ('Perfect Partitions', MM1371). Can I ask a second supplementary question closely related to my first?

I intend following your advice and put my OS on its own (50GB) Partition, which will have the letter C. My Data and Apps will be put on to partition D. My question is: do I have to configure my computer to automatically save all Data & Apps to partition D? If the answer is yes, how is this done?

Your help with this would be much appreciated. Thanks.

Cliff

If you're going to install Windows on a dedicated partition, and your programs and data on another, you'll usually dictate the location of install yourself when you set up various programs.

Simply choose a custom install option when offered, and instead of selecting the default location, which is usually the Program Files folder on the Windows drive, select another location, in this case your data drive.

If you're talking about Windows' own data files, you can move some of them, including your My Documents/Documents folder. To do this, simply locate the folder in Explorer, right-click it, and then click the Location tab. This will show you the current location of your documents folder. To change it, click Move and browse to the new location. This will put a redirection on the Documents folder, and your data will be moved to the new location. You can do the same for other folders too, such as Downloads, Music, Pictures, and Videos.

► You can easily move the location of the Documents folder, and others within Windows



Direct Route

A simple question requesting a simple answer from an IT simpleton. Every time I try to read up on this, though, my eyes glaze over!

I use a wired system from my NETGEAR DG834G, v4. The signal to our first floor flat is in CAT 5, but the phone terminal in the basement is a mess (when I move to fibre I'm hopeful they'll clean that up).

I've run fixed Ethernet cable to both desktops and the Smart TV, and plug into the fourth when I need to update the laptop. So, I don't use the wi-fi.

QUESTION: Is there a speed benefit in changing the router for a direct connection? Also, if it had five outlets could I insert a wi-fi setup on one outlet, for visitors wishing to use their laptops, tablets and smartphones?

Jay

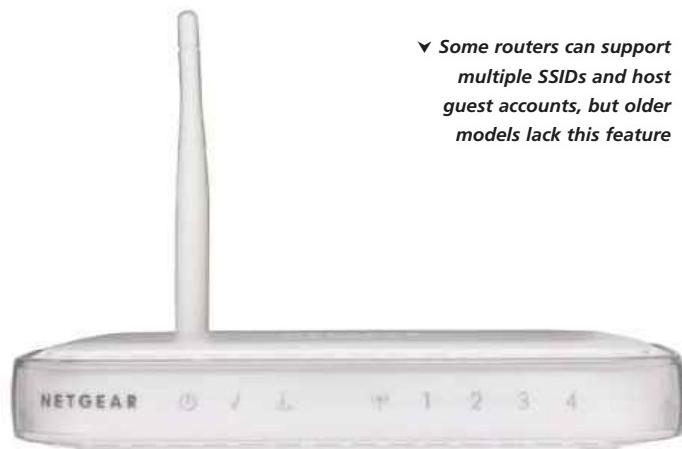
Home networking can be a confusing mess, Jay, so I wouldn't say you're a simpleton for having questions. A lot of people find it difficult to figure out. I can help, though.

I wouldn't recommend you switch to a direct connection, if by your question you mean plugging the cable directly into the wall socket/ADSL filter, bypassing the router. This can work, but it's fraught with problems and limited connectivity abilities. You'd have no control over the connection, and would lose the extra ports and security features. I'd stick with the router, as you'll probably not get a speed boost, at least nothing noticeable.

If you wish to know if there's a speed difference between wired and wi-fi, yes, there is. Wired connections will almost always be superior in terms of speed and reliability. wi-fi can be fast, and perfectly fine for most, but wired is the way to go for heavy users.

As for your visitor wi-fi setup, you don't need an extra outlet or device, simply activate the router's wi-fi and provide the access code to them. You could plug in a wireless access point if you wish, but this would cost more money – and, as you already have a working wi-fi router, there's no real point.

If you wish to setup guest access that's limited, rather than allowing full access to your network, you'd need to set up a second SSID, which many routers can allow you to do. This can have a second password, which you can give to guests. Some routers even have a built-in guest account feature, which makes it even easier. Sadly, I don't think your current router has this option, so you'd probably need to upgrade. Just to be sure, upgrade the firmware to the most recent you can, and log into the router's setup to see if you have any of this functionality available.



▼ Some routers can support multiple SSIDs and host guest accounts, but older models lack this feature

ASK JASON



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While we try to cover as many questions as we can, we regret that Jason cannot answer your questions personally, but he'll cover as many as he possibly can each week. Please ask one question per letter and remember to include the full specification of your computer, including its operating system.

Jason

Are You Experienced?

How do I access WEI, the Windows Experience Index, in Windows 10? I refurbish PCs for sale on eBay and I like to include screenshots of their WEI scores to give customers a guide to performance. This is no problem in Windows 7, but in Windows 10 I can't find WEI anywhere. Has this feature been removed, or has it been cleverly hidden (as with several other features)?

Graham, Gmail

It's gone, Graham. It's not in Windows 8.1, either. WEI was introduced in Windows Vista, and Microsoft hoped that publishers would implement the scoring system on the back of software boxes, giving customers clear guidance on whether or not their PCs were powerful enough. But it never took off, and after Windows 8, WEI was quietly dropped.

However, the underlying functionality for WEI is WinSAT –

Photo Finish?

When accessing her phone's 2GB microSD card, my daughter can only see 116 of her 611 photos. I've tried the card on my PC, via a USB reader, and there's a similar problem: Windows stops indexing after about the 16th photo and the card then disappears from Windows Explorer.

I've also tried copying the entire folder, but the process soon stalls with the following error: 'The destination you have specified does not exist.' This makes no sense, as there's plenty of space on my hard drive. The card disappears again, too. So where do we go from here? It would be nice to recover the photos if possible.

David Wood, TalkTalk

I think the error message is a red herring. Windows error messages so often are. I reckon the microSD card has a corrupted file system or – more likely, sadly – numerous faulty cells or blocks.

First, Dave, right-click the card in Windows Explorer and choose Properties. Hit the Tools tab and

the Windows System Assessment Tool – and this still exists in both Windows 8.1 and Windows 10. All that's really missing is the pretty user interface. Luckily, there are a few programs available that manage to recreate it.

Probably the best is the cumbersomely titled ChrisPC Win Experience Index: goo.gl/m9NIBA. Scores in Windows 8.1 and Windows 10 range from 1.0 to 9.9, just as they do in Windows 8. In Windows Vista the top score is 5.9, and in Windows 7 it's 7.9.

Obviously, performance between PCs can only be compared when those PCs are running the same OS or at least an OS using the same scoring system.

Note – When setting the program up, be sure to select Decline when prompted to install RelevantKnowledge. This is a market-research tool and effectively spyware.

▼ WEI – gone but not forgotten

The screenshot shows the ChrisPC Win Experience Index website. At the top, it says "ChrisPC Win Experience Index". Below that, there's a sub-score of 4.8. The main content area has a table with columns for Component, What is rated, Subscore, and Base score. The components listed are Processor, Memory (RAM), Graphics, Gaming graphics, and Primary hard disk. The sub-scores are 5.6, 7.1, 4.8, 9.9, and 5.9 respectively. A note at the bottom says "Determined by lowest subscore".

then the Check button. This will scan the card and attempt to fix any file-system problems.

If that doesn't help, it could be that the card is overheating. To minimise the stress on it, try copying just a few files at a time. However, if a lot of the files aren't readable or don't even show up, have a crack with a recovery program. A good example (there are numerous others) is ZAR (Zero Assumption Recovery): goo.gl/cBVYVB. It's free for image recovery.

Really, though, tools such as ZAR are designed to recover

files that have been mistakenly deleted or formatted over. A scan on a microSD card with physical damage may not bear fruit. If that's the case, and if the photos are valuable, consider posting the card off to a salvage specialist. A popular choice (again, there are numerous others) is Rapid Data Recovery: www.rapid-data.net. If files can be recovered, it looks as though you'll pay at least £97, though thankfully the company operates on a 'no fix, no fee' basis.

▼ Many file-recovery tools now work with memory cards and USB sticks

The screenshot shows the ZAR X build 62 software interface. It has a volume map at the top left showing a grid of sectors. On the right, there are several configuration panels. One panel shows "Bad sector handling" with options for "Timeout, ms" (set to 1000), "Retry attempts" (set to "No retries"), and checkboxes for "Avoid repeated retries" and "Forget bad sectors". Another panel shows "Maximum disk cache size, MB" with "Read cache" set to 16 MB and "Write cache" set to 16 MB. At the bottom, there are buttons for "Back", "Help", "Enter license key", and "Exit". A note at the bottom right says "Note: changes are effective immediately".

48 Hours

A few weeks ago I bought some DDR3 RAM on eBay. The kit was sold as being in perfect working order, but both sticks are faulty. After I'd installed them, my PC kept blue-screening, and Memtest86+ revealed so many errors I lost count.

I contacted the seller, wanting to return the RAM for a refund. I got no response, so I opened a case. I still didn't hear anything, so once the required eight days had passed, I escalated matters and was told I'd receive a decision within forty-eight hours. Well, that was over a week ago. I can see no way to escalate the case further, and phoning eBay just leads to frustration. How can I get my money back?

Stuart, East Sussex

Unfortunately, there are quite a few flaws in eBay's returns process, and I have to wonder if they're intended. Until recently, for example, it was impossible to enter Collect+ tracking numbers – the system just threw up an error. I reckon someone could have fixed this within ten minutes, so why did it take 18 months?

66 Don't be surprised if you have to explain the same thing several times 99

The eBay Money Back Guarantee states a buyer will always get a refund if an item doesn't turn up or needs to be returned because it's not as described. But this can cost eBay time and money, especially if there's a scam afoot and the seller has no funds in PayPal or the associated bank account. So it's no real surprise that buyers often have to jump through hoops in order to get anywhere. Could this be because eBay hopes they'll give up? Surely not!

Bits And Pcs

This week I have been mostly...

...reading at goo.gl/40Wmfd that truly flexible screens are finally on sale (sadly, the ones that roll up like newspapers are still at the prototype stage)

...playing The Colour of Money on The Roebuck's quiz machine and once again walking away with more coins than I put in (I spilt some of my Diet Coke in excitement)

...watching the recording of a celebrity edition of The Chase (all I'm allowed to tell you about it is that I fell foul of Virgin's silly two-minute rule at Euston and missed the last train to Lichfield)

...listening to a breadbin-full of Commodore 64 game music on YouTube (check out the fantabulous Monty on the Run: goo.gl/GWV9Yd)

...deliberating for far too long on what seats to have in the new car (a Juke Nismo RS): the standard sports seats or the Recaro bucket seats (I'll be sharing the car with two other people, so if I make the wrong decision I'll have to listen to daily complaints for the next three years)

Anyway, Stuart, by far the best way to resolve a returns problem is via eBay's online chat system. Curiously – or not – this isn't easy to access. It's pretty well hidden, almost never appearing as an available contact option. What you need is a direct link. And here it is: goo.gl/bmUzCH. Click the 'Chat with us' button, enter the item number, and click 'Start chat'.

Stay calm. It's a game – I'm certain of it. You'll almost certainly be transferred at least once, which may involve waiting in a queue. Don't be surprised if you have to explain the same thing several times and if the assistant still gets the item number wrong or thinks you're the seller. If the chat session ends without warning, just smile ruefully and play the game again. Stand firm. Don't give up. Most likely eBay will provide a pre-paid postage label, and from then on you're laughing.

Here's what happened

14 Sep	You opened a case
Reason for escalation	The seller didn't respond
07 Sep	You sent a message
Message	I'm still waiting on that pre-paid, tracked returns label, or the funds for us to purchase.

▲ **But what happens if 48 hours have passed and you've not heard a dicky-bird?**

Note: A record of this chat session will be sent to your email address.

Online
Agent is typing...

▲ **The best way to resolve problems on eBay is via a chat session, but how on earth do you open one?**

Crowdfunding Corner

This week's crowdfunding picks both style themselves as types of robot. Although we think that's true in one case more so than the other

SoundBot II Speakers

Building on the success of previous Kickstarter project, the SoundBot II is essentially an updated version of the original wireless speaker. SoundBot II adds a number of new features and functionality to give you even more portable hardware.

As well as being a high-quality wireless speaker, the SoundBot II has support for Siri (and other digital assistants), NFC bluetooth pairing and even wireless charging (compatible with any Qi-powered charge point). Rubber pads keep it in place, and it's about the same size and weight as an apple, so it fits almost anywhere you want to use it. The hardware is available in five colours – pink, green, blue, brown and black – and comes with a PowerBot charge point in the same colour.

A variety of early bird tiers mean you can probably pick up a SoundBot for less than the full kickstarter price, but at most you'll pay \$62 with shipping – that's just under £40 – with units shipping in November of this year. If you want more items, you can buy multiples at a discount, and if the project reaches a \$40,000 stretch goal (it's at \$10,000 after just two days live) then everyone paying over \$30 gets a USB power bank for their phone, tablet or MP3 player. Not a bad deal at all!

URL: [kck.st/1UYJmzJ](https://www.kickstarter.com/projects/1uyjmzj/soundbot-ii)

Funding Ends: Friday, October 16th 2015



Dobot Arduino-Powered Robotic Arm

Single-board computers like the Raspberry Pi and Aruduino are giving people simple access to incredibly complex computer hardware and building a new generation of enthusiasts. It's no surprise, then, to see incredibly complex accessories being built to work with them – and the Dobot might be the most desirable yet.

This four-axis, high-precision robot arm runs using Arduino and is compatible with all kinds of hardware. It can draw, write text, move, and grab things following your orders. It brings industrial level precision to your home – one video on the Kickstarter page shows how it's precise enough to thread a needle. It supports control methods through a variety of means, from apps and PC software, to voice and gesture control, even EEG-based "thought" control.

Best of all, it's completely open source so, despite all the stuff you can do with it now, there will be even more to come later on. It's fairly expensive – £350+ with shipping – but for that you get a robot arm with clipper, sucker, laser head, angle sensor, Bluetooth module, pen and pen clipper, giving you a world of opportunities. You can even choose one of three colours (silver, white and gold). Its shipping in December this year and has already blown past its original target. The only question now is whether you want to be involved.

URL: [kck.st/1Nu4MPh](https://www.kickstarter.com/projects/1nu4mph/dobot-arduino-powered-robotic-arm)

Funding Ends: Wednesday, November 4th 2015



Disclaimer: Images shown may be prototypes and Micro Mart does not formally endorse or guarantee any of the projects listed. Back them at your own risk!

App Of The Week

Recolor

This week, we dig out the colouring books and crayons

Having a browse through the shelves and stacked tables of Waterstones the other day, I noticed that there seems to be a trend for the colouring book. More specifically, an adult colouring book.

By adult colouring book we don't mean pages of nude models in various poses, poised waiting for you apply the old crayon to. Rather, these are intricate and amazing fractal and kaleidoscopic designs that when finally applied with colour looked very stunning indeed.

However, digging a little deeper, it appears that the adult colouring book is actually a therapeutic experience – one that possibly reminds us of our youth and a more trouble- and stress-free time. Experts have discovered since that

the colouring book can release some of the built-up stresses of the day and can actually help us unwind in a healthier and more creative way than hitting a bottle of wine at the end of the day.

Recolor

This week's app, for iOS, takes this new stress busting medium to the digital platform. Recolor is a simple setup, with over 200 different monochromatic drawings of fantastic detail. There are the more simplified swirls and doodle-type drawings, complex patterns and shapes, Escher-themed images and some very intricate drawings of wildlife, patterns and people – all ranging from a beginner to expert colourer.

Features At A Glance

- Free.
- Over 200 templates to colour in.
- Very relaxing pastime.
- Various themes to choose from.

All you need to do is select the drawing you want to colour with, then from the palette available along the bottom of the screen, you select the colour you want to fill in the sections of the drawing with and you start colouring with your finger.

Stress-Free Colouring

It may sound odd, but it does actually work as a stress buster and relaxation app. The regular commute flew by, with our minds focusing instead on the colours and the emerging pattern we were forming.

Furthermore, it allowed us to escape from the usual dirge of the grey morning work run and people watching, and it actually forced us not to look at our emails and start work several hours before we're contractually obliged to.

The app is very well designed, easy to use and looks amazing when you finally finish off the drawing in all its colourful splendour.

Conclusion

It may not be everyone's cup of tea, but for the sake of an hour or so of relaxing and taking your mind off the usual worries of the day, it's a great addition to your busy phones and tablets.

Can we recommend giving it a try? Certainly, and since Recolor is free and the 200-odd templates are either free or available as an in-app payment, we think you should at least give it a try when you're feeling a little overworked.

Rediscover the joy and relaxation of coloring. Just tap to color!



▲ There are some amazing templates to colour in



▲ The colouring-in process can be fine-tuned, and the results stunning



▲ Relax and simply colour in, for a more stress-free lifestyle

Logging Off

T departments are about to come under intense pressure, I predict. But they probably deserve it. Why? Because when they should have been signing up to the future of computing, they've been supporting old technology and relying on digital dinosaurs like Windows 7.

At least, that's what Microsoft is about to start telling them, in an effort to give its Windows 10 boat a more spectacular maiden voyage.

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PUBLISHED BY

Dennis Publishing
30 Cleveland Street
London
W1T 4JD
Tel: 0207 907 6000
www.dennis.co.uk

PRINTING

Printed By: BGP
Distributed By: Seymour

Certified Distribution:
13,712 average copies
Jan-Dec 2010



The tech industry is almost unique in one aspect, and it's how older products are painted once new ones appear. Once a new version of something arrives, those behind it try to distance the company from prior versions like they were made by someone else.

If you translated this to the motor industry, you'd see TV adverts where the previous iteration of the Audi Quattro would be openly described as 'pants' compared with the new one.

But with operating systems, for example, Microsoft is about to assault Windows 7's security features, which it designed, to point out how much better Windows 10 is.

You notice that it's not taking aim at Windows 8 in this instance, because this OS made virtually no penetration into the business world whatsoever.

Microsoft's problem is that business people tend to look at the bottom line on making changes, and security in general is considered an advantage that's almost impossible to quantify. Unless people start saying that Windows 7 is not fit for purpose, in the modern world, then they'll stick with it.

I know this because so many of them are still using Server 2003, even though it's no longer supported, and plenty still have machines running XP.

What might seem like a straightforward upgrade for home users comes with a very long list of caveats for business people, because the physical upgrade of the PC is nothing compared with the retraining of staff, adapting legacy applications and replacing old peripherals that are no longer supported.

All this expenditure usually needs to be justified on efficiency improvements, and doing that in a way that doesn't seem horribly contrived and overly optimistic is really difficult.

The only plausible way that Windows 10 is likely to make any headway is with new hardware purchases, though that didn't do much for the Windows 8.x uptake.



What this highlights is the almost entirely opposing directions that companies like Microsoft and businesses are heading in. Whereas Microsoft is all about reinventing itself and reinvigorating the Windows platform, IT departments are (or should be) all about creating a stable and cost controlled environment to do business in.

Playing the security card is an act of desperation, because most well organised operations focus on the various entry points for threats and are less concerned about individual computers. As long as a threat can't jump from one machine to another easily, that one becomes infected is less of a problem.

If you're defending a castle, you put your troops on the battlements, not put one in every room. And considering that many of these businesses are using tools like XP still, they've already assumed their machines are a weak point and invested in trapping incursions elsewhere.

Honestly, I'm not sure what Microsoft can do in the face of business intransigence, because it's a powerful force that won't easily be bent to its will.

Mark Pickavance

LAST WEEK'S CROSSWORD

Across: 7 Block Capitals, 8 Obtusi, 9 Canute, 10 Egotist, 12 Ascot, 14 Karma, 16 Satchmo, 19 Minder, 20 Parody, 22 Joel McCormack.

Down: 1 BLOB, 2 Occult, 3 Eclipse, 4 Spock, 5 iTunes, 6 Platform, 11 Graviton, 13 Lampoon, 15 Module, 17 Chrome, 18 Track, 21 DHCP.

DISCLAIMER

The views expressed by contributors are not necessarily those of the publishers. Every care is taken to ensure that the contents of the magazine are accurate but the publishers cannot accept responsibility for errors. While reasonable care is taken when accepting advertisements, the publishers cannot accept any responsibility for any resulting unsatisfactory transactions. Recently, we've been looking for a new game to play, and we're particularly after an MMO. After trying several titles, we eventually landed on DC Universe Online, which allows you to create your own superhero or, indeed, supervillain. That got us thinking: what super powers

would we go for if we had the choice? Well, first we'd need to arrange some kind of chemical or energy explosion, which would give us those powers (rather than, you know, just killing us). And once that was sorted out, we'd probably go with something like the power of persuasion, and we'd probably use it for evil rather than good. You don't want to make us a cup of tea? Yes, you do. You really want to make us a cup of tea. And you want to bring us some biscuits with it. Mwah ha ha! Evil indeed. Of course, if we were forced to use our powers for good, then we'd probably bring about world peace of something like that. Hopefully, after doing that, someone might bring us a cup of tea.

THIS WEEK'S CROSSWORD

Across

7 You might find some shivering on the seabed? (7,6)

8 The form of a word that is used to denote more than one. (6)

9 Appearance of a photograph or halftone that has been enlarged so much that the pattern of crystals in the emulsion can be seen in the photo or its reproduction. (6)

10 The class of serfs of ancient Sparta, intermediate in status between slaves and citizens. (7)

12 A specialised version of BASIC designed specifically for game development. Includes features like custom types and functions. (5)

14 A payment made to a person in a position of trust to corrupt his judgment. (5)

16 The practice of searching for a romantic partner on the internet, typically via a dedicated website. (1-6)

19 A flat panel or area on an electronic device such as a television, computer or smartphone, on which images and data are displayed. (6)

20 Free from an obligation or liability imposed on others. (6)

22 The region surrounding the earth or another astronomical body in which its magnetic field is the predominant effective magnetic field. (13)

Down

1 Excessive fervour to do something or accomplish some end. (4)

2 Do something to an excessive degree. (6)

3 A slow or stupid person. (7)

4 A tool used to thicken or spread metal by forging or hammering. (5)

5 What manufacturers may be

forced to issue when serious faults

become apparent in sold products. (6)

6 Egyptian pharaoh husband of Nefertiti who introduced the monotheistic solar cult of Aten and moved the capital from Thebes to the new city of Akhetaten. (8)

11 A bureaucrat working for the European Union. (8)

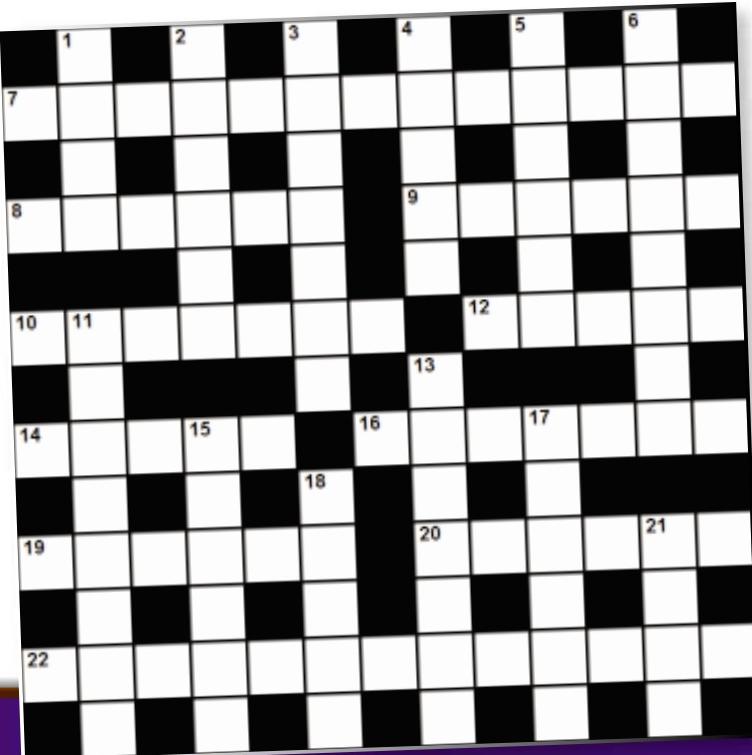
13 Google product that automatically delivers text and image ads matched to website content. (7)

15 American multinational corporation that designs, manufactures and sells aircraft, rotorcraft, rockets and satellites. (6)

17 Their fourth album, the 1969 rock opera Tommy, included the single 'Pinball Wizard' (3,3)

18 The state of forming a complete and harmonious whole, especially in an artistic context. (5)

21 An incidental benefit awarded for certain types of employment. (4)



In Next Week's Micro Mart*

- Buyer's guide special!
Motherboards, graphics
cards and more!
- Effective
encryption for
portable storage
- Exploring the
dark web
- Plus the usual
mix of news, reviews
and advice



* May be subject to change

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